



FRIDAY, AUGUST 8, 1879.

Safety-Floor for Iron Bridges—Pittsburgh, Cincinnati & St. Louis Railway.

The engravings herewith, and the company's specifications which follow, leave nothing to add excepting that some other roads would do well to imitate the practice of the Pittsburgh, Cincinnati & St. Louis Railway, in the construction of this very important safeguard to bridges.

SPECIFICATIONS FOR STANDARD BRIDGE-FLOOR FOR IRON BRIDGES.

General Arrangement.—The floor is to be laid on outside stringers of wood and centre stringers of iron, composed of sawed white-oak ties and guard strips, framed, notched and bolted together in a thorough and substantial manner, as shown in accompanying plan.

Outside Stringers.—Outside stringers to be of selected white-pine, straight-grained, free from large or unsound knots and windshakes, to be 5 in. in width, and of equal depth with iron stringers in same floor. They are to be not less than three panels in length, and laid breaking joints.

Ties.—Ties are to be 6 by 8 in. sawed from live white oak timber, free from rotten knots, wind-shakes and all other imperfections; to be cut 10 ft. long, with two square ends.

found that great latent capacities exist for the increase of the business and the revenue to be derived thereby.

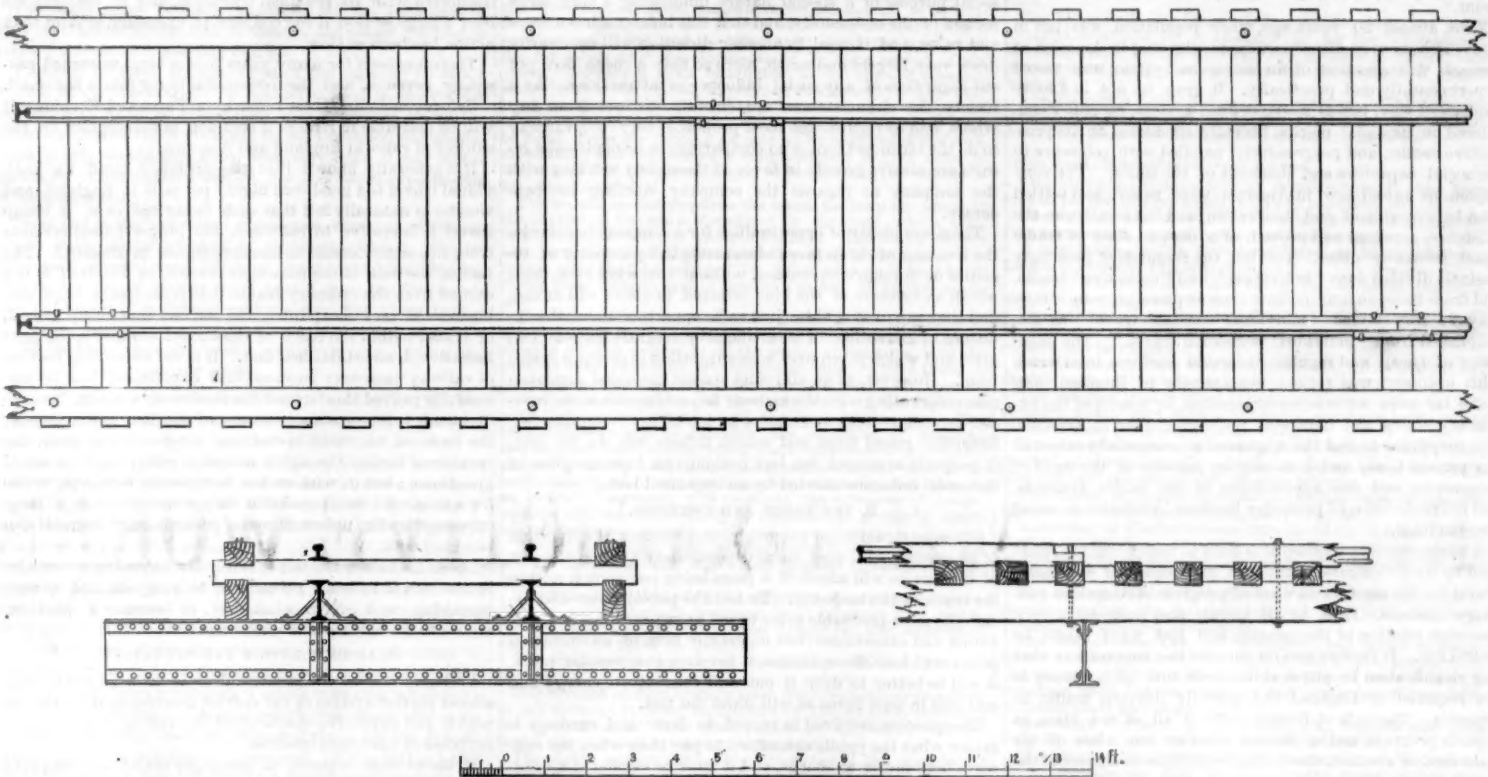
Comparatively stationary and dormant at present from the want of the thorough investigation and experimental test, which such a process would involve, yet there is every reason to believe that very rapidly upon the application of such a trial a healthy progress would result. Each phase of the business, both in its present and prospective aspect, requires for itself a thorough analysis, for it is an incontrovertible fact, to use the words of a late editorial in these columns, that "if there is any one thing in the history of American railroads more astonishing than the enormous development of their freight traffic, it is the stationary character of their passenger traffic."

Now, an examination of the nature in question will demonstrate that this subject does not and has not received that kind of attention and study in America which, on comparative grounds and with reference to its great possibilities, it can deservedly lay claim to. Not very long since, the writer took great pains to draw the attention of those concerned to the position of one branch of passenger business in America by an analysis of the character and requirements of local passenger traffic. The result of that endeavor was a far from satisfactory one as regards the causes for the stationary character of this traffic, and involved a confession amply testified to since, that the ordinary methods of operating the business fell very far short of the social requirements of the

passenger trains is the increase of receipts from third-class passengers. While the receipts from first-class passengers have increased from £3,002,838 to £3,948,812, and while those from second-class passengers have increased from £3,527,377, to £4,935,512, those from third-class passenger have increased from £3,616,192, to £7,473,727, or have, in fact, more than doubled.

The figures showing the number of passenger journeys by passengers of different classes point to results of an equally important character. While the number of first-class passenger journeys increased from 18,302,384 to 31,839,091, and those of second-class from 41,693,289 to 74,153,118, those of the third-class increased from 79,145,464 in 1858 to 224,012,194 in 1870, or were nearly trebled. The elasticity of third-class traffic has thus proved itself to be so great, and the results from it have acquired so much importance from their amount, as above shown, in proportion to the other classes, that it becomes an interesting question to consider whether, by what means and in what proportions the receipts from this description of traffic may be still further augmented. * * * "The excursion system indicates to some extent what may be done as regards both profits to the companies and facilities to third-class passengers. There are many objections to that system as at present carried on, too frequently with extra or acting servants, inferior rolling stock, and inefficient arrangements." * * * "By extending or introducing greater regularity into that system, and by cheapening and improving the third-class communication throughout the country, an impetus might be given to third-class passenger traffic which would, by its results, throw the above figures, astonishing as they are, completely into the shade."

From this statement to the government of Great Britain, at the critical period when the two rival questions of amal-



SAFETY-FLOOR, USED ON PITTSBURGH, CINCINNATI & ST. LOUIS RAILWAY.

They are to be sized to 5 1/4 in. over main and outside stringers, locking down on said stringers not less than 3/4 of an inch. Ties are also to be notched near the ends on upper surface 3/4 in. deep by 8 in. wide to receive guard strips. They are to be spaced 16 1/2 in. on centres, except the two ties nearest the centre of a 30-foot rail, which will be 16 3/4 in. on centres.

Particular pains must be taken to arrange the ties so that each rail-joint shall come in the centre of the space between two ties. Special care must be taken to plug all old spike holes when correcting alignment of rails.

Guard-strips.—Guard strips are to be 6 by 8 in., of the same quality of timber as the ties, to be in lengths when finished of 25 ft. 2 3/4 in. or 19 ft. 9 1/4 in., to be sized to 5 1/4 in. over each tie, and lock down on each tie not less than 1 1/2 in., not less than 3/4 of an inch being taken out of the tie and 3/4 of an inch out of guard-strip. Each length of guard-strip to be spliced or halved to the pieces adjacent, with a splice not less than 8 in. long, and each splice secured by a 3/4-in. bolt passing through guard-strip, ties and outside stringer.

Bolts, etc.—Guard-strips, ties and outside stringers are to be secured together, in addition to the notching and locking referred to above, by 3/4-in. button-head bolts spaced 5 ft. 5 1/2 in. on centres; bolts to be provided with plate-washers at each end; nuts to be on top of guard-strips, and to be secured by Verona nut-locks. Two hook-headed bolts are also to be provided, in addition to above, to secure guard-strips, ties and outside stringers to flanges of each floor beam; washers, nuts and nut-locks to be used on each bolt, as above.

Guard-strips must be in perfect line and parallel to rails. In notching ties, saw scarf must not be cut below proper depth of notch.

All other labor not particularly mentioned above, but required for the completion of the floor, must be done in the most thorough and workmanlike manner.

On bridges in dangerous locations guard-rails are added on the inside of the main rails, and placed seven inches from them.

Contributions.**Excursion Traffic.**

TO THE EDITOR OF THE RAILROAD GAZETTE:

If the general subject of American passenger traffic be dissected up into its component parts, and these submitted to the microscope of intelligent research, it will certainly be

time, and in proportion as they did so the revenue from this particular source could not possibly be progressive from the very lack of social adaptation to the necessities of the case. The investigation has since been extended to the subject of excursion traffic, a more important branch than is generally supposed.

In order, however, to connect the line of research, the closing remarks from the previous investigation will be in place.

"From a close observation of the causes which produce the large passenger traffic returns on the English railways, and which draw out so large a proportion of third-class traffic there, the writer is inclined with reason to believe that the principal cause for it is the very extensive cheap excursion travel which is so actively pushed in England, and for which the tariff is so far below the ordinary scale of fares. In this respect England is almost an exceptional country, and has built up a system which is most profitable and worthy of a careful analysis by us on this side, to see how far it can be followed up in America."

The writer had a firm impression at the time that a closer inquiry into the details of English passenger traffic would fully sustain the opinion then expressed. The method of analysing passenger receipts in England is somewhat misleading in one respect, and that is the aggregating a large amount of undefined traffic under the head of third-class business. This class is credited with an enormous and most disproportionate increase as compared with the other two classes, and it has been difficult to find a reliable and full explanation and analysis of this traffic to account for its growth. The following, however, will be final, conclusive, and to the point.

Sir Henry Tyler in the year 1871, in his capacity then of Inspector to the Board of Trade, drew up one of the ablest and most concise reports yet met with. After remarking that "the total receipts from passenger trains increased from £11,697,904 in 1858 to £19,301,911 in 1870, he sums up the whole question of passenger receipts as follows:

"The most important feature as regards the receipts from

gamation and state purchase were uppermost, and under special discussion by the country, it is readily seen just what the great bulk of this so-called third class traffic consisted of.

Traffic in Great Britain, which would otherwise have been comparatively stationary, (for Sir Henry gives the increase in season-ticket and other special sections of the business), was thus marvellously progressive, and the particular class of the traffic, or the social explanation of this increase, is that represented by the name of "excursion travel." This is fully supported by unprofessional testimony of an equally important and reliable character given just a few years prior to the year 1858, the year selected by Sir Henry Tyler.

In Dickens' *Household Words*, in the year 1851, (nearly 30 years ago, be it remembered) when England was just experimenting in the excursion field, preparatory to the immense progress made in that quarter of the globe, with the remarkable results which have contributed to make the passenger traffic on the large English lines even more lucrative (in the gross: far more so in the net) than that derived from what we call freight, and is there styled merchandise or goods traffic, the following occurs:

"For several years, the Southwestern Railway Company were solicited to run cheap excursion trains, but for some reason or other refused to do so. At length a reluctant consent was obtained, though with many qualms as to its result. The first train started one fine Sunday last year with upwards of 1,500 passengers, which, in the short space of two months, gradually increased to 2,000, and has been steadily on the increase. It was considered that these trains would only answer on Sundays. The results of a Monday experiment were, however, that three excursions trains were running on this line at one time, consisting of nearly one hundred carriages, yielding a large amount of profit to the company. It was thought, however, that although trains from London to Southampton might pay, the latter town would never be able to furnish a sufficient number to fill a remunerative train to the metropolis. In consequence, only a few excursion trains were started from Southampton to London, and those at fares double those charged in the opposite direction. The consequence was, total failure from want of patronage. At last the experiment was tried of an ex-

cursion train at the same fares as those charged from London to Southampton. The result was extraordinary. "On the morning of departure the neighborhood of Southampton was like a fair; upward of 1,500 persons took advantage of it to visit the metropolis. The receipts were £203 (over \$1,000), and the expense of working by three engines did not exceed £40 (say \$200). So complete was the success of these excursions, and so profitable were they to the company, that measures were immediately taken to provide extra accommodations. These trains, in fact, came to be regarded as a regular and not an occasional source of revenue, it being found that they did not interfere with the ordinary traffic.

"On the Great Western line the results were beyond all expectation. The profit netted by the company was very considerable. Nearly 6,000 persons were conveyed on the first cheap trip to Bath and Bristol. But, however gratifying all these facts may be (and they are rendered still more so by the preparations at present made and making by several railway companies to accommodate the public with excursion trains at considerably reduced fares), still we can only accept them as instalments of what must eventually be done. It has been prognosticated by those thoroughly conversant with railways, and equally so with arithmetic, that a railway Rowland Hill (the inventor of the penny postal system) will yet arise and organize periodical excursion trains to run similar distances in the mileage between London and Brighton (say for simplicity, 50 miles) for the small sum of sixpence.

"If omnibuses 'can rattle over the stones' for two hours for sixpence each passenger, and, after deducting the expense of coachman, conductor, horses, and the wear and tear of the vehicle itself, still yield a good profit to the proprietor, a railway train only occupying the same time in the journey, stuffed full of sixpenny passengers, would yield a handsome profit."

Thus, almost 30 years ago, when population was not in Great Britain very disproportionate with that in America at present, this question of an excursion system was tested experimentally and practically. It grew up not in a mere haphazard way, but as a well-defined system, carefully considered on its social merits, liberally conducted on its prospective results, and progressively handled with reference to the social capacities and demands of the times. The very objections raised now in America were raised and settled then by experiment and observation, and the result was the existence, accepted and proved, of a distinct class of traffic apart from any other. This left the elements of passenger business divided into "individual" and "collective" traffic, and from these an intermediate class or phase grew up which may be fitly styled "individual constant travel" as distinguished from "individual occasional travel." The possibility of cheap and regular excursion business interfering with ordinary was settled conclusively in England, and under far more adverse circumstances, by reason of the extent of country and nature of the traffic, than in America. It is surprising to find this argument so commonly raised at the present time, and it is only an instance of the want of recognition and due appreciation of the habits, demands, and characteristics of passenger business in relation to social surroundings.

A more complete solution it is hard to realize than is rendered by an investigation into the philosophy of excursion travel for the mysterious want of progress in American passenger business. It is to all intents and purposes a very thorough solution of the question and just what might be looked for. It further sets on one side the supposition that any classification by physical methods into such classes as are required in England can actually develop traffic in America. The bulk of British traffic is all of one class, as regards progress, and no matter whether one class of car were used or another, there would still remain apparent the fact so clearly proved by experience, that classification has not produced the results in question, and that in more recent years the tendency has been, in England, in just the opposite direction.

For really large results one class must be looked to—the poorer and agricultural and industrial class—the social third-class of Great Britain corresponding to the working class on this continent.

The following headings involve the really salient features of the subject from our own point of view, and it will facilitate the investigation to subdivide it accordingly.

First—Population and its influence on an excursion system.

Second—The fares and earnings from excursion traffic.

Third—Accommodation and attractions.

Fourth—The cost and method of operating excursions for the information of passenger departments of railways.

1. INFLUENCE OF POPULATION.

The influence of population under various circumstances is a question which, when advanced as an objection and obstacle to an extensive traffic of accumulated numbers of the public at special seasons dictated by social demands, may be readily divided by a consideration of the manner in which an excursion system should adjust itself to suit the varying conditions of society which exist.

An agricultural community affords one form, an industrial another distinct from it. There are peculiar social proclivities attaching to each, and any one arbitrary system for drawing out the mass in either case will prove to be a failure. The strongest lever for working upon the agricultural class is that of a coöperation with the various social organizations on the basis of a division of the profits for the mutual benefit of such societies and of the railways working with them. Individually, separated by distances, the bulk of an agricultural community has very little inducement on the mere holding out of cheap fares to make excursions systematically and frequently, and except on public national holidays it will be found almost impossible to draw them out in numbers without the aid of some such influence as can be exerted by the more prominent social organizations with which they are connected. In agricultural communities the coöperative system will be the best to start with at any rate, and as a system it will live

and progress. It has one great feature especially in its favor, and that is that by means of it the community make known their wants in this respect, are in a position to give a guarantee to cover the actual cost of train service, and can be depended upon for an ascertained number turning out. It removes the risk of actual loss, dictates the capacity of the people in respect to the price or fare, and assumes the position of a temporary active agency for the railway in localities otherwise impossible to reach. To suppose that an ordinary traveling agent in such a country as we are considering could cover the ground in any such way as this is absurd. He might take a tour or two and do good work there in assisting the societies, but to fill their place he would be entirely useless. So much for agricultural communities, where population is thin. In more populous regions and industrial centres the coöperative method combined with the independent will fully succeed; but to throw over even these the coöperative principle altogether, is entirely wrong—and is just such an instance as the writer has in mind when he speaks of a lack of social observation and capacity to meet social wants. A society with a membership of say 5,000 active persons coming to a company with a guarantee for 1,000 at a rate of so much a head is a distinct feature in the business, and the correct line of reasoning would be, not that the company can draw a crowd independently at a cheap fare itself, and therefore prefers to do its own business, but that this is a distinct social purpose of a special nature influencing a very large section of the community, and that this influence has a force and value, and if used in another direction will necessarily draw very largely and much more so than a cheap fare put out regardless of any social influence or attractions. As a society, the circumstances are entirely distinct from any others, and as regards the most profitable way for a railway to do the business there is no comparison to be made—the results are always greatly in favor of the society working with the company as regards the company working independently.

There are plenty of opportunities for a company to exercise the leverage of cheap fare inducements independently of societies or foreign coöperation, without throwing over those which an instance of the kind referred to above will afford, and they are or should be just such opportunities as the influence of attractions of an artificial or natural character can give, and which it requires no organization to produce traffic from. However, as an all-round system the social organization coöperating with the railway is *par excellence* the revenue-earning system, and cannot be too highly recommended. Saturday round trips and season tickets will do the rest, if properly arranged for, but nothing can take the place of the social influence exerted by an organized body.

2. THE FARES AND EARNINGS.

Given any particular excursion undertaking, the question of its success will very much depend upon whether the cost of the service will admit of a price being put upon it within the reach of the majority. To feel the public pulse and decide the most profitable price to sell at requires much observation and experiment; but unless any item of an excursion policy will bear the operation it involves at a popular price, it will be better to drop it out and concentrate energy and material in such items as will stand the test.

The question involved in regard to fares and earnings is rather what the public can afford to pay than what the railways may prefer to charge, and it must be regulated accordingly. In America to day a very common impression maintains that the moment a railway goes into the excursion business at popular prices, away goes its hold upon ordinary business. This is erroneous and narrow; nothing could be more so. Ordinary business has nothing whatever in common with legitimate excursion business, and, what is more, an excursion train of 1,000 people—a not uncommon thing—does not consist of ordinary passengers nor of passengers who would otherwise have gone anyway at ordinary fares. There is great inconsistency in this common objection, and the very best proof of its utter weakness in social or profitable grounds is to bring it to the test of experience. It is absurd to say that ordinary traffic in England is unimportant; the fact is, it is of very great value and is very jealously guarded. Great centres of industry are within easy distances of great natural and scenic attractions. The busy hum of the manufacturing cities is not far away from that of the tempting sea-shore in any part of the British isles, but to suppose for a moment, after years of solid experience, that such a suggestion as the injury of one class of business by the other would in these days have any weight, is an approach to primitive misconceptions of social capacities.

The particular circumstances of each community will dictate its capacities, and where the mass is reached by a popular excursion the very idea of ordinary business from a few individual travelers being affected thereby is not worth a moment's thought. The point is to choose the more profitable of two undertakings, and not to refuse to make \$500 for a railway by a popular excursion because it might have been just possible to have made \$100 without it. Ordinary business on such an occasion, if less profitable than the other, must in common sense give way. The argument is so uncommercial in its character that it ought never to have been found necessary to meet it among those whose profession should find them especially able in sifting out the merits of such peculiarities in the conduct of this traffic. All the tariff-making, rate-manipulating in the world will not create new, fresh travel; it will merely either demoralize or contract traffic already existing; new ideas, broader views, with deeper study and closer observation of the tendency of human nature and society from time to time, must constitute the passenger superintendent of the fu-

ture. Every available chance to amalgamate the interests of a railway with the prevalent and varying demands of society must be carefully seized upon and profitably controlled.

The opportunity will always, as history has proved again and again, be there; but, if the power to appreciate it and adopt it is wanting, dormant, as a consequence, must be the results.

That society requires recreation and travel combined is an established social fact.

That society is not a combined commercial travelers' association is also a social fact—traveling merely because it has to.

That, in addition to ordinary individual travel, there is a large amount of collected travel is a fact which experience in any and all communities has amply proved.

That short excursion-travel, cheap and rapid, founded on the great secret for recuperation of the faded sons of men, by constant and frequent change of scene, is also a social item proved by the most ordinary observation, does not call for statistics to prove it.

Finally, that society is composed of numerous and varying elements, requiring education and study to appreciate and utilize them, is the *summum totum* of the whole subject in this direction.

Considering the profitable character of the business, it is surprising to any one who has, like the writer, been closely connected with its practical operation, and in building up over a large section of the country an excursion system, that action has been so slow.

There has been for many years past a large unearned passenger revenue, and the responsibility for this is not small.

Before concluding these remarks on Fares and Earnings, it will be desirable to remove a common misconception on the subject of rates in England and America.

It is generally known that the ordinary tariff for individual travel is a good deal higher per mile in England, and wonder is naturally felt that such being the case, if cheap travel is lucrative to railways, the proportionate revenue from this source should be so much higher in England. The fact is, the bulk of the passenger revenue in England is not earned from the ordinary traffic, but from special excursion business at very cheap rates, and the fact that cheap travel, or travel within the reach of the largest number is the most lucrative, is an established fact. It is the redeeming feature of railway passenger business that experiment has so successfully proved this beyond the shadow of a doubt. To earn dividends is the *summum bonum* of English management, the basis of all their operations, often making them the enemies of society through a mistaken policy and too much greediness; but if, with such a fact plainly before us, it can for a moment be supposed that they would do such a large excursion traffic, unless it were preëminently lucrative, is hard to credit.

Cheap travel for the many is rapidly becoming a necessity in America if railway revenue is to progress, and a very promising one it is. In what way, it becomes a question, are we to provide for and encourage it?

3. ACCOMMODATION AND OPERATION.

Probably one of the greatest drawbacks to an otherwise almost perfect system of car-service is occasioned by the unwieldy and expensive character of the rolling-stock for the purposes of excursion business.

If the average capacity of passenger trains be compared with the average accommodation occupied in them, and the dead and paying weights compared, the result is far from gratifying or complimentary to railway intelligence. If a railway were a benevolent institution, purely charitable, nothing could be more conducive to excite pity and sympathy for its condition than such results as these. If any one will take the trouble to hunt up the last report of the Massachusetts Commission, he will find the facts such as they are.

It simply amounts to this: That an utter want of economy predominates in the American system, and what there is to counterbalance it, it is hard to see. Let any one ride through a whole night in a well-filled, ordinary first-class car, with no support much above the centre of his spinal column, and he will fail to see just where the advantage is, either to himself, the public or the corporations. Again and again it must happen that a car to accommodate 50 or more, and proportionately heavy, is added to accommodate half or less than that number; and the result of a year's actual working will simply be the rendering inoperative of a large amount of expensive car construction, the hauling of a large amount of dead weight, and the loss of a large amount of money from lack of rolling stock to accommodate all the excursion business offering or capable of being operated. Small, cosy, airy, clean, light cars, half-way between the present bulky weight and the penned-up arrangement in England, would be a great advance, retaining as they might this way, the beautiful adjustment of the car-body to the bogie tracks, the railways would bring into play a great deal of half-used material, and diminish considerably the dead weight, with an increase of comfort to the public.

The tri-composite system in England shows just how economical and revenue-earning that system is. Nearly half of the complete rolling-stock of the largest English railways consists of tri-composite coaches—first, second and third class—and the bulk of the single coaches consists of third class coaches. Their car stock is adapted to earn, not lose, money.

The history of American cars is just what might be expected. Barry, in his standard work on "Railway Appliances," when discussing the "bogie" system, remarks that it was an English invention for dealing with the particular circumstances of the early American railways, in which,

from commercial considerations, long carriages were desirable, though the railways in question had sharp curves, and were laid with a rough description of permanent way." Their adaptation to early peculiarities is quite possible, and their want of adaptation to modern requirements is still more so.

4. METHOD OF OPERATION.

There are one or two improvements in the matter of operating excursions which are comparatively recent, and may be of some value.

The most useful excursion tariff is one constructed with the rates for various mileages for various given numbers of passengers.

Thus, for a distance of ten miles, taking the cost per train mile at a liberal estimate, to tariff the cost per head for say 50 passengers up to the maximum number which could be accommodated on one train. Allowing, for the sake of illustration, one dollar per mile, and the number of cars (capacity per car 60) at 10 to a train, then for a distance of 10 miles each way (20 miles) the tariff would run as follows: Train mileage, \$20; cost per head for 50 passengers, 40 cents; for 100, 20 cents; for 150, 13.3 cents per head; for 200, 10 cents per head; for 300, 6.6 cents per head; for 600, 3.3 cents per head. In any case a guarantee of \$20 covers the entire cost, and the last column should give the fare per head to be charged to make the operation profitable.

The tariff must be made subject to all the influences of cost of transportation and as close to the actual position in respect thereto as it possibly can be.

Probably no more stringent test of the capacity of such a system of excursion traffic as that advocated in the foregoing remarks could be found than that presented under the social conditions which maintain in the Dominion of Canada. Most people would say there was very little if any scope, especially in the Eastern section, for successful experiments in that direction.

From the writer's personal experience, however, while engaged in the organization of a permanent system, the results have justified very different conclusions being drawn. During the comparatively short period since the first inception in Canada of a defined policy—some five years only—the most convincing experiments have decided beyond a doubt the great capacity in the country referred to for the development of passenger traffic.

These experiments were sufficiently decisive to lay the foundation of what has since become a distinct and growing class of railway business, from one end of the Dominion to the other. The greatest success, both in point of numbers and revenue, was achieved under the coöperative principle, which the writer has described already; and it may be fairly said that it was due to this policy that such a rapid growth was achieved. In the spring of the year 1875, the first experiment was made with the distinct object of settling a question at issue at the time as to the capacity of what was held by most to be an entirely non-producing excursion section for this new line of business. Under the auspices of the Methodist churches, with a guarantee to cover the actual cost of train mileage for special service, and a scale of fares averaging a cent a mile over a territory of some 150 miles, an arrangement was made for a coöperative excursion on a percentage division for the benefit of the various church funds concerned. From 800 to 1,000 persons took part, and the financial results were exceedingly successful and surprising. During the course of the year 1875 a limited number of very well paying excursions were run from various quarters until the capacity for the development of business was made matter of fact. The following years, especially in respect to the coöperative class of excursions, showed great success. And it will be found that during a series of years of great financial depression both in Canada and the United States, while the local passenger receipts fell off to a startling extent, yet in Canada the aggregate receipts were very evenly maintained by this particular means, leaving a far more favorable showing in proportion than elsewhere.

It was difficult often at the time in which the first experiments were made to convince those who were not in a position to view the traffic field all around, that the falling off in passenger receipts was not due to the running of cheap excursions; but as time went on, and each section had an opportunity to thoroughly sift the question in its actual merits, it was found that where ordinary traffic would not continue, from the stagnation of business, and people would not travel for business purposes where business did not demand it, they might be found to travel for pleasure on the cheap excursion policy. Moreover, it was, after a time, decided by the general opinion of the most experienced men that the one class of traffic was distinct from the other, and was comparatively independent of it.

The large numbers who participated again and again more clearly defined the distinction. For it was in the year 1877, June 26, that as many as 1,172 persons took advantage of the first cheap excursion run from Eastern Canada to visit the Falls of Niagara. The gross receipts amounted to some \$6,000 on this occasion.

This was tried with equal and greater success on several occasions, and could be so to-day. The policy spread in fact from that time to the Western section, and has since grown there to very large dimensions.

Schools, societies and church bodies, one and all, to-day have adopted the custom of an annual holiday excursion, and nothing more is ever heard of the old complaint that ordinary business was injuriously affected.

Making the guarantee of a number or an amount *sine qua non* as a qualification for an excursion, was a safe pro-

tection against loss from the chance of empty trains being run with ordinary passengers at reduced fares.

In the fall of 1877 as many as 4,000 persons came out on one excursion only, and about the same date from a different section as many as five thousand came out.

Seaside excursions from 2 to 300 miles from the coast became and still are an annual undertaking at the close of the Summer season, when the wealthier classes are away and the poorer glad to get an opportunity of a short trip within their means for a week or two. The record in Canada is full of proofs of the successful development of traffic and the effects are themselves conclusive by the maintenance of aggregate passenger receipts.

It would be a very marvellous thing if, after the example and results obtained in England and also in Canada, the stationary character of the passenger business is allowed to remain as a testimony against those who should bestir themselves to study the social character of the times more thoroughly.

F. J. LEE.

Georgia Railroad Regulation.

Thus far no less than eight bills having for their purpose the inauguration of legislation under what is known as the railroad clause of the new constitution, have been introduced in the Legislature and referred to the Committee on Railroads. This committee, after duly considering these various measures, has agreed to report, as a substitute for all, a bill which was drawn by Hon. John I. Hall, of Spalding. The first section of this bill provides for the appointment by the Governor, of three competent commissioners to be confirmed by the senate, one to hold office until January, 1881, another until 1883, and the third until 1885, the term of office for subsequent appointments to be for a period of six years. No person shall be eligible to the office of commissioner who is the officer, employee or stockholder of any railroad, or who is the holder of any bonds or other obligations of any railroad in the state. Prescribes how vacancies shall be filled, gives the form of an oath to be required of the commissioners, and requires each commissioner to give bond in the sum of \$10,000, conditioned to perform all the duties of his office faithfully.

The second section requires the board to keep an office at the capital of the state, furnished by the state, which shall be kept open every day except Sundays. The books, papers and records pertaining to their office shall be kept by a secretary who shall be selected by them and shall be wholly under their control, and to receive a salary of \$1,600 annually.

The third section prescribes the duties of the commissioners, requiring them to take general supervision of the operations of all the railroads of the state, to examine into the manner that railroads are operated, and require them to adopt such rules and regulations as will secure the accommodation of the public and the compliance of the railroads with their several charters and the laws of the state. The commissioners are to examine the condition of railroad tracks, road-beds, rolling-stock, cars, station-houses and any and all property used in operating railroads, and shall cause such changes, additions and improvements to be made thereto as, in their judgment, will promote the interests of stockholders and insure the safety of persons and property transported thereon.

The fourth section requires the board to adopt such rules and regulations as will effectually prevent the payment, directly or indirectly, of rebates.

The fifth section requires the adoption of rules and regulations to define through business, local business and tariffs for local and through rates, and prescribes the manner of regulating the tariff on freights.

The sixth section prescribes stringent methods to prevent pooling.

The seventh section confers upon the commissioners power to call upon all railroad authorities for information touching the operations of their roads, and for any other fact the board may deem it necessary to apply for.

The eighth section defines the character of the complaints that can be made, and prescribes the manner of correcting them.

The ninth section provides that when any railroad company is reported to the commissioners for violation of its charter, or the laws of the state, or regulation of the commissioners, or when the commissioners have reason to suspect such violation, the commissioners shall cite the president, or chief officer in this state before them at a time not more than twenty days off and have a full and thorough hearing on the question. The citation is to be in writing, and is to be served by the sheriff of the county where the officer resides, fifteen days before the hearing. The commissioners are to have all necessary power for the taking of testimony, and should the railroad company be found in violation of its charter, or statute laws, or regulation of the commissioners under this act, the commissioners shall declare such railroad company under penalty and adjudge the amount of same for each delinquency, which sum shall not be less than one hundred nor more than one thousand dollars in each case.

Section ten provides that the permission of the court appointing a receiver of a railroad shall not be necessary to enable the commissioners to proceed against him, and the property of a railroad company in the hands of a receiver shall be subject to the rules that in the hands of owners.

Section eleven provides for the statement of charges in freight receipts, and makes it a violation of law to charge more than the rate so stated.

Section twelve for the manner of entering up judgments by the commissioners and the return of the same to the clerks of the superior courts, and that executions thereon shall be enforced the same as at common law, and such judgments are made liens inferior only to liens for taxes to the state.

Section thirteen provides for appeals to the superior court, and the trial of the same by a special jury selected from the grand jury.

Section fourteen provides that this act shall not authorize the commissioners to disregard the charter rights or contract rights with the state of any railroad company, nor be construed to relieve any company from the forfeiture of its charter for legal cause, nor from liability for damages, nor relieve any officer or employee from criminal prosecution for any act touching the matters herein referred to.

This bill appears to give general satisfaction to those who have given thought to the matter, and it will doubtless become a law. It fully meets the requirements of those who have clamored against undue discriminations, and is at the same time, careful of the rights of the railroads, and conservative in all its parts. Whether the bill, when it becomes a law, will meet the expectations of the public depends upon the character and capability of those who are to give effect to its provisions. If the commissioners to be appointed under the bill are good, honest and capable men, the provisions of the bill will be found to be wholesome and effective.—*Atlanta Constitution*, July 31.

THE SCRAP HEAP.

Railroad Equipment Notes.

The Missouri Car & Foundry Co. is building 30 flat cars for the Green Bay & Minnesota; 10 box cars of extra size for the Chicago & Western Michigan, and 200 freight cars for other roads.

The Jackson & Sharp Co., at Wilmington, Del., last week completed an order for 14 railroad postal cars to run between Richmond and New Orleans, over the Richmond & Danville, Atlanta & Charlotte Air Line, Atlanta & West Point, Western of Alabama, Mobile & Montgomery, and New Orleans & Mobile railroads. These cars are 50 feet in length, one-third fitted up for the distribution of letters, one-third for papers and second class matter, and the rest for storage of through mail. They have all the most recent improvements to facilitate the distribution of mail. The letter and paper cases are made of ash and cherry varnished. The cars all have Winslow safety stoves, Miller platforms, and Westinghouse brakes, and are first-class in every detail. They are painted pure white and lettered "United States Fast Mail Railway Post-Office."

A. Whitney & Sons, in Philadelphia, have foreign orders on hand for 1,360 cast-iron chilled car-wheels; they will go to Cuba, South America and England. In the past two years they have shipped over 500 street-car wheels, on axles, to Brazil and 200 to the Argentine Republic.

From Jan. 1 to June 30 the Baldwin Locomotive Works, in Philadelphia, shipped 44 locomotives to foreign countries.

The Rogers Locomotive Works, at Paterson, N. J., have delivered a new anthracite-burning passenger locomotive to the New York & Greenwood Lake road.

The Beaver Falls (Pa.) Car Works have delivered a combination passenger and baggage car to the new Montour Railroad.

The Ohio Falls Car Co., at Jeffersonville, Ind., has lately received contracts for a sleeping-car for the Vicksburg & Meridian road; 10 flat cars for the Denison & Pacific; one passenger and eight box cars for the Ft. Madison & Northwestern.

The Hamilton (Ont.) Forge Co. is making 2,000 axles for freight cars now being built by the Ontario Car Co., at London. The Hamilton Rolling Mill is making the iron.

Iron and Manufacturing Notes.

The Allikanna Rolling Mill, at Steubenville, O., has been sold to parties in Cincinnati, who will hereafter run it.

The rolling mill of W. D. Wood & Co., at McKeesport, Pa., has started, up again after extensive repairs.

A new rolling mill is to be established at Fredericksburg, Lebanon County, Pa., it is said.

Coplay Furnace, near Allentown, Pa., is being repaired, and will soon go into blast.

The rolling mill at Duncansville, Pa., has been leased to B. M. Johnston, who will start it up as soon as some necessary repairs can be made.

Swift's Iron & Steel Works, Cincinnati, are running full double turn, and have been obliged to refuse orders.

The Burgess Iron & Steel Works, at Portsmouth, O., are running double turn with a full force, and have more orders on hand than at any time since 1873.

The Ohio Falls Iron Works, at New Albany, Ind., have started up the spike mill, which has been idle two years. The rail mill is running full time on orders.

The rolling mills and furnaces at Chattanooga, Tenn., all report increased demand and plenty of orders.

A number of the furnace-owners in the Hocking Valley Region in Ohio have formed an association for the purpose of testing and developing the iron ore deposits of that region.

The rolling mill at Lynchburg, Va., is offered for rent to parties having the requisite capital and skill, by Gen. Thomas T. Munford, the owner.

The Abbott Iron Co., of Baltimore, has made arrangements to start up its rail mill again, and is now prepared to receive orders for iron rails. The rail mill has not been in use since 1876, but the company has made large quantities of boiler-plate and other iron.

Conestoga Furnace, in Lancaster, Pa., was put into blast July 24, and is making 25 tons of pig iron a day.

The Mohawk & Hudson Manufacturing Co., of Waterford, N. Y., gives notice that the Eddy valve patent suit is now ended and that there is no further fear of risk or liability in buying or using Eddy valves made by the company.

The Indianapolis Rolling Mill is making 500 tons of new iron rails for the Chicago & Lake Huron road.

Bridge Notes.

The contract for a new iron bridge over the Naugatuck River at Derby, Conn., on the New Haven, Derby & Ansonia road, has been awarded to Murray, Dougall & Co., of Milton, Pa. It will have two spans, one of 97½ and one of 101½ feet.

The Smith Bridge Co., of Toledo, O., since July 1 has taken orders for 56 iron and combination bridges. Of these, 31 are for the extension of the Cleveland, Tuscarawas Valley & Wheeling road to Wheeling, and the rest are highway bridges for counties and towns in Ohio and Indiana.

The Ohio Bridge & Iron Works, formerly at Lancaster, O., are putting up new shops at Urbana, O. They have contracts on hand for a railroad bridge for the Cincinnati, Sandusky & Cleveland road, several highway bridges and the iron work for a new court-house at Urbana.

A new bridge is to be built across the Shenandoah River at Harper's Ferry, Va. It will be a Howe truss, 612 ft. long in four spans. The contract for the superstructure has been let to the King Bridge Co., of Cleveland, O.; for the masonry, two abutments and three piers, to Samuel Walton, of Charlestown, W. Va.

Attempts at Train-Wrecking.

Mention has already been made in the *Sun*, of attempts to wreck a freight and express train at Paw-Paw, on the Baltimore & Ohio Railroad, on Tuesday and Sunday mornings last. On Saturday night last, passenger train No. 8 jumped the track at Havana, about 24 miles from Sandusky, on the Lake Erie Division of the Baltimore & Ohio Railroad. The engine, baggage, mail and express cars and three coaches were derailed. The engineer and fireman were killed, and a tramp who was stealing a ride was slightly injured, but none of the passengers were hurt. It was afterward found that a new tie had been placed across the track so as to upset the engine. The officers of the road in this city state that the most thorough investigation will be made into the matter, and large rewards will be offered for the arrest and conviction of the perpetrators. No punishment could be too severe for an act which has not only caused the death of two faithful employees, but also jeopardized the lives of innocent passengers. The company say that they are at a loss to understand the motive for such a crime, as neither any real or fancied wrong could have been righted by it. Besides this, the present season is a very busy one, the traffic to and from the West being unusually heavy. Instead of men being discharged, new hands are being put on daily. There is extra work and pay for employees in every department, and a good feeling exists all along the line of road.—*Baltimore Sun*, July 29.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

A MARITIME RAILROAD.

On another page will be found the letter from Captain Eads and other communications from Messrs. Chanute, Flad and C. Shaler Smith on a proposed railroad across the Isthmus of Panama for the transportation of ocean steamships, sailing vessels and ocean craft generally. The proposal comes in this wise: As most of our readers know, a congress has recently been held in Paris, under the auspices of M. de Lesseps, the engineer of the Suez Canal, ostensibly to discuss the subject of an interoceanic canal and to recommend the best route. The proceedings and recommendations of this congress have attracted a great deal of attention, and excited much discussion all over the civilized world. The cost of the work is very roughly estimated at from one hundred to two hundred millions of dollars. In view of this enormous cost, Captain Eads' letter is intended to show that an interoceanic railroad capable of carrying the largest ships can be built for fifty millions of dollars. The difference in cost of fifty to one hundred and fifty millions of dollars seems to be worth consideration, even in these days of what seems to be a plethora of money.

Before discussing this subject, it should be remembered though how very prone the human mind is to run riot when it comes to consider questions which involve very great magnitudes, which have not been reduced to any exact or precise estimates or measures of value. Before adopting the suggestions of the engineers whose communications we publish, it may be well to step carefully among the gigantic facts which they present.

To transport a ship and cargo, whose aggregate weight is from 8,000 to 10,000 tons, on a railroad, is so far beyond anything of a similar character which has ever been undertaken before, that a great deal of the most careful investigation is required before even the most experienced engineers would be qualified to express an opinion which would be worthy of any regard. The practice of making drawings of great

works on a small scale and of constantly regarding such work as simply the development by multiplication of an original diminutive plan results in a habit of mind which is apt to assume that the size and capacity of any structure can be indefinitely increased simply by multiplying its dimensions by any desired factor. No serious difficulty is encountered if this method is employed on small structures, in which there is a great excess of strength in the parts, but when it is applied to very large structures, as bridges or buildings, it soon appears that, while the linear dimensions increase in proportion to the factor, of multiplication the surface is as its square, and the cubical capacities and weights are as its cube. In bridge-building, for example, we soon reach a limit beyond which it is impossible to increase the span with any given material. The same principles which lead to this result in bridge-building also affect the construction of the cars, locomotives and track of a railroad, although it is very difficult or impossible to define their exact limits, as we can in bridge construction.

In this article it is proposed simply to consider some of the difficulties which must be overcome in order to carry out Captain Eads' plan, and to carry a ship say 450 feet long overland, the weight of which has already been stated.

It must be kept in mind that the framing of a ship is designed for a structure which is intended to float in water and which is therefore supported by exactly the same pressure in every point. No provision is made for supporting a moving load, and the only cause of instability is due to the action of the waves. Therefore the problem of supporting and carrying a ship overland presents many and very great difficulties. All who have considered this question are agreed that some form of frame or cradle will be required to support the ship, and, in fact, it is almost impossible to conceive of any other way of doing it. A rough sketch of such a cradle is given with Mr. Chanute's letter. The question then comes up, how to support a ship without injury to it in such a cradle. Owing to the greater or less instability of such a structure, due to the yielding nature of all materials of which it could be built, and also to inequalities of a road-bed and the oscillations due to its own movement on the track, it would be necessary to provide some means of supporting the ship so that the pressure on the points of support would be equalized, otherwise it would be liable to be strained injuriously. Various plans for accomplishing this have been proposed. One engineer has suggested the construction of a great caisson and filling it with water to float the ship. Another speaks of supporting it on slings made of wire rope. Others have devised methods of wedging up under the keel and the bilge. The difficulty is in securing an equal pressure on all the points of support. It would seem as though a system of pipes and hydraulic jacks, all connected together, could be arranged in the cradle underneath the ship, so that by producing a pressure in the pipes exactly the same pressure would be transmitted to each plunger of the jacks. The liquid used in the pipes would thus become a perfect means of equalizing the loads on the points of support. But any system which can be devised will involve a structure of sufficient size and strength to support the vessel. Its weight will be enormous, and the question how to carry them both, or, in other words, to devise a suitable track and running gear, is attended with very great difficulties.

To judge from the experience in constructing ordinary freight cars, the weight of the vehicle to carry a ship would be about one-half that of its load. Mr. Chanute estimates it at 2,000 tons, which seems too little, because, assuming the number of wheels at 2,000 and their size at 36 in. diameter, their weight, with that of the axles, boxes, jaws and springs, will alone be 1,000 tons. The following are the weights in detail of these parts:

2,000 36-in. wheels, at 600 lbs.	1,200,000 lbs.
1,000 axles, at 340 lbs.	340,000 "
2,000 journal boxes, at 90 lbs.	180,000 "
2,000 pedestals, at 125 lbs.	250,000 "
2,000 springs, at 45 lbs.	90,000 "
Total	2,060,000 "

The truck frames of such a structure would necessarily require to be very heavy, in order to equalize the pressure and weights, and their weight with that of the cradle or body to support the ship would be at least double the weight of the wheels, etc., so that it would seem impossible to keep the weight below 3,000 tons. Assuming that of the ship and cargo at 9,000 tons, we would have a total of 12,000 tons to carry, and with loads of five tons per wheel 2,400 wheels would be required to carry it. The question then comes up, how these wheels can be distributed so as to carry the cradle

and the ship to the best advantage. Two methods suggest themselves, one to distribute them uniformly, or nearly so, under the whole length of the cradle, the other to cluster them together at each end of it, so as to form two centipede trucks or bogies, with the cradle resting on a centre plate. If the first plan is adopted, we have the difficulty of adjusting the wheels under and near the centre of the vehicle to the vertical and horizontal curvature of the track. If the latter plan is employed, the cradle would need to be immensely strong and heavy to carry its load, as it would be supported on two abutments placed at a distance of about one-sixth of its length from the end, so that the clear span would be about 800 feet. If the weight were equally distributed on this, it would be equivalent to a bridge of that span with a load of 26½ tons per running foot—an extremely formidable structure.

If the wheels composing each truck were distributed on eight trucks, as proposed, there would be 150 on each track, or 75 on each rail. For the sake of having a number which is evenly divisible, we will take this at 72. This number of wheels could be gathered into 24 groups of three wheels each and each pair be connected together with equalizing levers. The latter could then be equalized by a second lever, each pair of groups of three by a third lever, each pair of groups of six by a fourth lever, each pair of groups of twelve by a fifth lever, the three groups of twelve by a sixth lever, and finally the two last levers by another equalizing the whole.

A better arrangement would be to arrange the wheels of each truck in a group of 64 on each rail. This would enable us to equalize groups of 2, 4, 8, 16, and 32, and by allowing each system of equalizing gear to turn about a centre-pin the wheels would all adjust themselves to the curves, whereas if the wheels are finally arranged in three groups, the centre group must have enough lateral motion to move a distance equal to the versed-sine of the curve occupied by the whole system of wheels composing one truck.

If the wheels are arranged under the whole length of the cradle and are not clustered together into two great bodies, then we encounter the great difficulties, first of equalizing the weight on them; second of making them adjustable to the curves, and third of distributing the strain on the flanges in going around curves so that it will not be excessive on a few of the wheels. It would be of very great importance that the latter should be equalized as well as the weights. The force required to change the direction of such an enormous load as that which must be carried, when it encounters a curve, would, of course, be very great, and must be distributed among many wheels.

If the plan proposed by Captain Eads is adopted and the road is built in straight and level lines and provided at the angles with turn-tables, the latter will present many difficulties. A structure of that kind, over 400 ft. long, capable of moving a load of 12,000 tons, would be very costly. There can be no doubt that the difficulties of constructing a vehicle for transporting large ships on railroads would be much diminished if the latter consisted altogether of straight lines. In that event the equalizing of the weight on the wheels could be effected by the hydrostatic system already described. That is, the weight would be transmitted to each wheel by a plunger connected with a system of pipes in which a certain pressure would be maintained.

The turning of a ship on a turn-table would probably not require more time than that needed to pass a vessel of that kind through the lock of a canal.

The motive power would probably present the least of the difficulties. It would seem, though, that a system of wire rope traction similar to that employed on steep inclines would be the most available for moving such loads as those which must be dealt with in such a project as this maritime railroad.

It seems as though it would be possible to construct a road of this kind at very much less cost if a special class of ships were designed for the purpose. Of course a very small proportion of the shipping of the world would be engaged in the traffic across the isthmus. It would seem to be folly to expend immense sums of money for the purpose of adapting such a road for the large class of vessels which would never use it, if by changing the method of construction of ships the cost of the road could be materially reduced. It would be singular if by taking thought engineers could not devise a ship better suited to an amphibious traffic than those are which are intended for a marine existence alone. It offers a tempting field to inventors, and if Captain Eads' letter will do nothing else, it has at least launched the whole question on the sea of speculation, from which it may emerge, possibly, in some more definite and clearly-defined form, but in which for the present, at least, we must leave it.

NEW YORK GRAIN RECEIPTS.

Our last review of the receipts of grain at New York by the different routes was for the four months ending with April—a period when nearly all the receipts are by rail, the exception being some arrivals by coasting vessels and in the early season of 1878 a few days' receipts by canal. We found then that percentages of the total receipts of grain and flour (flour reduced to bushels) had been, by each route, as follows for five years:

Four months ending with April.					
	1875.	1876.	1877.	1878.	1879.
New York Central...	42.9	48.5	42.5	55.3	47.0
Erie.....	32.3	28.5	28.3	23.3	28.7
Pennsylvania.....	18.3	19.2	17.7	13.5	19.4
Other roads.....	1.9	2.0	0.7	1.4	1.7
Total by rail...	95.4	98.2	89.2	93.5	96.8
By water.....	4.6	10.8	12.8	6.5	3.2
Total.....	100.0	100.0	100.0	100.0	100.0

The receipts for the four months had been 35,876,000 bushels in 1879, against 32,790,869 in 1878. The New York Central had carried a little smaller quantity this year than last; all the other roads a great deal more than ever before.

During the three months that have elapsed since this review was made, the canal has played an important part in supplying New York with grain. It was delivering grain during the entire three months in 1878, and during all but about two weeks the other two years. It of course reduces the proportion carried by railroads, however great the quantity they may carry.

The quantities (bushels) carried by each route during the three months ending with July, which may be called the first three months of open navigation, and the percentage by each route have been:

Three months ending with July.					
	1875.	1876.	1877.	1878.	1879.
N. Y. Central.....	5,010,285	9,004,794	4,007,740	8,793,846	13,009,015
Erie.....	5,378,723	6,618,944	2,904,647	3,912,818	2,813,531
Pennsylvania.....	2,175,716	2,073,134	1,023,109	2,188,029	4,225,205
Other roads.....	21,088	48,004	53,709	63,838	41,614
Total by rail.....	12,585,812	18,345,880	7,994,205	14,968,531	20,089,365
By water.....	9,807,558	14,111,377	11,308,860	23,544,031	14,000,491
Total.....	22,393,370	32,457,257	19,303,065	38,512,562	34,089,856
Percentages of total:					
N. Y. Central.....	22.3	29.6	23.9	22.8	28.2
Erie.....	24.0	29.4	11.8	10.2	17.9
Pennsylvania.....	9.6	8.4	5.3	5.7	10.7
Other roads.....	0.1	0.1	0.3	0.2	0.1
Total by rail.....	56.0	58.5	41.8	38.9	48.2
By water.....	44.0	41.5	58.7	61.1	51.8
Total.....	100.0	100.0	100.0	100.0	100.0

Here we find, comparing 1879 with the previous year, that the total receipts were 1,157,000 bushels (3 per cent.) greater, but the rail receipts were 67 per cent. greater and the water receipts 38 per cent. less—the railroads delivered 10,100,000 bushels more, the canal 8,900,000 less.

Part of this decrease in canal receipts, as we intimated before, was due to the shorter canal season; and a great deal of it, too. Canal shipments in May of 1878 were next to the largest of the year, and among the largest ever known, but this year the May receipts by canal were less by 4,950,000 bushels. Still, this had no effect on June and July deliveries. In those months the water and rail receipts at New York were, for the two years:

	1879.	1878.	Inc. or Dec.	P. c.
By water.....	11,159,563	12,583,007	D. 1,423,444	11.2
By rail.....	17,004,624	9,591,385	I. 8,013,239	83.5
Total.....	28,164,187	22,174,392	I. 6,589,795	29.1

Thus, in this period of uninterrupted canal deliveries, there was a decrease of about one-ninth in canal receipts—leaving them still much larger than in almost any corresponding two months previous to 1878. The decrease by canal for the two months would not be at all noticeable but that there was such an enormous increase in rail receipts at the same time, they being five-sixths more than in 1878, when they were larger than ever before.

The proportion carried by the canal having fallen off so largely, naturally each of the railroads has carried a much larger proportion, the New York Central leading, as almost always it has done for several years, but this year carrying more than one-third of the total New York receipts. We shall understand the relative rank of the different railroads better by comparing the percentages of the total rail receipts carried by each, which are given below for the three months:

	1875.	1876.	1877.	1878.	1879.
N. Y. Central.....	39.8	52.4	58.0	58.8	55.8
Erie.....	42.7	36.0	28.5	26.2	27.2
Pennsylvania.....	17.3	11.3	12.9	14.6	16.9
Other roads.....	0.2	0.3	0.6	0.4	0.1
Total.....	100.0	100.0	100.0	100.0	100.0

The changes in proportions for the past three years are noticeable in no other respect than as showing a considerable gain for the Pennsylvania.

Comparing with the three months of 1878, the railroads altogether, as we have seen, carried 10,091,494 bushels more this year, and of this increase the New York Central carried 5,176,069 bushels, or 51.3 per cent., the Erie 2,901,013 bushels, or 28.7 per cent., and the Pennsylvania 2,036,636 bushels, or 20.2 per cent., the "other roads" having lost 0.2 per cent. The locality of the surplus grain production has considerable effect on this; for though the larger part of the

grain comes from markets and districts accessible to all the roads alike, yet there is still a large amount produced on the lines controlled by the different trunk lines, and this was especially the case last year, when the winter wheat crops in the Ohio valley and Michigan were unusually heavy. Wheat marketed at local stations of the Marietta & Cincinnati and other Ohio lines of the Baltimore & Ohio is most likely to go to Baltimore, that marketed on the Lake Shore or Michigan Central roads is not likely to go either to Baltimore or Philadelphia. Thus the proportions delivered in New York by the different roads do not determine exactly their success in competing with each other, though they give some indication of it.

We will now consider the deliveries at New York of the different routes for the whole period of seven months ending with July, during nearly two-thirds of which there were no receipts by canal (but always some inconsiderable ones by coasting vessels). These were, in bushels:

	1875.	1876.	1877.	1878.	1879.
N. Y. Central.....	12,437,593	18,433,563	11,001,141	20,917,037	30,834,433
Erie.....	10,975,445	12,029,302	6,262,033	11,537,398	17,111,021
Pennsylvania.....	5,345,395	4,383,411	3,708,938	6,031,888	21,184,732
Other roads.....	350,291	419,243	106,589	530,885	645,103
Total by rail.....	29,111,624	35,264,519	21,198,701	45,018,128	69,775,214
By water.....	10,607,512	16,165,808	13,251,233	25,875,005	15,701,085
Total.....	39,719,136	51,430,327	34,449,934	70,893,133	85,476,299

This year shows an increase in aggregate receipts for the seven months of about 6 per cent. over 1878 and of 119 per cent. over 1877. Comparing with 1878 we have:

	1879.	1878.	Inc. or Dec.	P. c.
Rail receipts.....	59,774,214	45,018,128	I. 14,756,086	32.8
Water receipts.....	15,701,085	25,875,005	D. 10,173,920	38.6
Total.....	75,475,299	70,893,133	I. 4,582,166	6.5

The season of canal deliveries being wholly included in the last three months of the seven, which we have considered above, we need not say anything more of the water receipts, further than to exhibit below the percentage received by each route:

	1875.	1876.	1877.	1878.	1879.
New York Central.....	31.2	35.8	32.1	37.8	40.8
Erie.....	27.6	23.4	18.1	16.2	22.7
Pennsylvania.....	13.4	8.6	10.8	9.3	14.8
Other roads.....	0.8	0.8	0.5	0.7	0.8
Total by rail.....	73.1	68.6	61.5	64.2	79.1
By water.....	26.9	31.4	38.5	35.0	20.9
Total.....	100.0	100.0	100.0	100.0	100.0

That but 21 per cent. of the receipts should be by canal would be an extraordinary fact, considering that canal rates have been lower than ever before known, but for the further fact that the railroads for a great part of the time were also carrying at the lowest rates ever known and for less than cost.

During the seven months the canal had been open (there are usually very few canal receipts at New York until two weeks after the opening) 75 days in 1875, 89 in 1876, 85 in 1877, 107 in 1878, and 85 in 1879. The late opening in 1875 goes far to account for the unusually small proportion of canal receipts that year; the next year, in spite of much lower rail rates, the canal gained greatly. And it is only in comparison with last year, when the canal was open a fourth longer and there were canal receipts nearly a third more days, that the canal receipts have fallen off at all. They were nearly, but not quite, as great in 1876, and smaller in the other two years. If the percentage of receipts by water is unusually small this year, it was unusually large in 1877. And generally we may expect the canal to have a larger percentage when the total receipts are small, and a smaller percentage when the total is very large, because the canal boats carry little besides grain, and so must carry grain or do nothing. But when there is a very large grain movement, the capacity of the canal-boat fleet can be but moderately increased, while that of the railroads can be enormously almost at a moment's notice; that is, without resort to new construction. When grain presses, the car stock of the whole country can be largely devoted to grain-carrying; but only New York canal-boats are available on the Erie Canal. The largest deliveries by canal at New York in any one month were about 14,000,000 bushels, in October, 1878, when rates were so high that every craft that could carry grain was put into service, and the average monthly receipts after July, when rates were generally satisfactory to the boatmen, and the boats were pretty generally and constantly employed, were about 10,000,000 bushels. The largest rail receipts in any single month heretofore were 11,733,000 bushels, in August, 1878. The rail receipts fluctuate much more than the canal receipts. Grain-carrying is not the sole nor the chief business of the railroads.

The roads began to take considerable quantities of grain in the summer for the sea-board ports first in 1875; but their competition did not begin to be seriously felt until 1876, when their rates were reduced to previously unheard-of figures by their competition among themselves, which was probably fiercer and more determined than it has been at any time since, when the lowest rates have been the result of accident

rather than of any definite design. Still, the July deliveries at New York by the railroads were but 50.6 per cent. of the whole in 1876, against 46.6 per cent. the previous year. The fact was that then, as since, the very low rail rates worked in favor of Baltimore and Philadelphia rather than New York, and those cities made their greatest gain that year when, as was generally supposed, the New York Central was giving its whole energies to making the rates to New York as low as to any other port. In 1877 there was a very great decrease in the total receipts, and the railroads maintained a 30-cent rate from Chicago after June, as against a 20-cent rate the previous year. The railroads carried scarcely one-third of their 1876 July grain, and but 27.8 per cent. of the whole, as against 50.6. In 1878 rates were utterly demoralized, and in July probably 16 cents was the maximum rate. There was an exceptionally heavy traffic, of which 48.6 per cent. was carried to New York by rail, as against 50.6 in 1876, and 46.6 in 1875. This year rates were 20 cents all the month, but probably considerable quantities were carried on contracts as low as 15 cents. But the proportion carried by rail, as well as the quantity, was much larger than ever before—the percentage, 59.6 per cent., as against 48.6 last year; the quantity, 3,500,000 bushels, or 65 per cent. more than last year, and still more than in any preceding July. If we knew just how much of this grain was carried on contracts, we could see more clearly the effect of the rates; but still more interesting would be the amount of lake-and-rail grain; that is, the shipments made by steamers, or steamers and barges, from lake ports consigned directly to the railroads at Erie and Buffalo. For these shipments the railroads are accustomed, we believe, to make any rates necessary to compete with the canal, and there is now usually very little, if any, difference, for this freight, between canal rates and rail rates from Buffalo to New York. The canal rates, however, have never been so low as the Buffalo-New York proportion of the lowest through rail rates, so that it has often been better for the trunk-line railroads to receive their grain from vessels than from their Western rail connections.

But the chief interest is in the proportions of the total rail grain received by the several roads, which are given below:

	1875.	1876.	1877.	1878.	1879.
New York Central.....	42.7	52.3	52.2	59.0	51.6
Erie.....	42.7	36.0	28.5	26.2	27.2
Pennsylvania.....	17.3	11.3	12.9	14.6	16.9
Other roads.....	0.2	0.3	0.6	0.4	0.1
Total.....	100.0	100.0	100.0	100.0	100.0

The New York Central has fallen from the rank which it had last year, but only about to that which it had in 1877, and it still has delivered more than half of all the grain received by rail at New York. Most of what the New York Central has lost the Pennsylvania has gained, but the Erie has also improved its position materially since last year, but in no other year of the five has this road delivered so small a proportion of the rail grain. The Pennsylvania this year delivered a larger proportion than ever before, though it is still a little below the proportion which it had in 1877. Putting it in a different shape, of the total increase of 14,156,086 bushels of grain received by rail in the first seven months of 1879 over the rail receipts in the corresponding months of 1878, 3,917,395 bushels, or 27.7 per cent., were by the New York Central, 5,574,559 bushels, or 39.3 per cent., by the Erie, and 4,551,864 bushels, or 32.2 per cent., by the Pennsylvania. Both the Erie and the Pennsylvania, therefore, have obtained a large part of the increase than the New York Central. This was effected wholly before navigation opened. We have seen above that in the last three months the New York Central obtained more than one-half of the increase in rail grain, and our review for the first four months of the year (published May 23, page 285, of this volume) showed a small decrease in New York Central receipts, with large increases on the two other roads.

But we will see the course of the movement from month to month this year by inspecting, in the following table, the receipts by each route for each month of this year:

	New York Central.	Erie.	Penn.	Other roads.	By water.	Total.
January.....	2,380,749	1,507,282	1,719,394	219,212	171,730	6,138,356
February.....	1,192,787	2,701,678	2,338,217	211,132	300,003	6,802,817
March.....	5,331,821	2,713,501	1,554,408	130,140	214,869	9,945,139
April.....	4,800,168	3,285,305	1,857,378	41,008	208,659	9,982,538
May.....	3,908,080	1,957,001	1,537,230	13,505	3,449,858	10,945,899
June.....	4,001,543	2,035,703	1,128,029	17,345	5,149,087	11,960,970
July.....	5,100,392	2,220,948	1,520,127	10,074	6,009,876	14,870,917

The fluctuations from month to month are quite noticeable, but some of them are easily accounted for. The Erie suffered much and the New York Central more by the January snow-blockade, and both of these roads are likely to have reduced shipments shortly after the opening of lake navigation, because the grain is held for the lake-and-canal or lake-and-rail routes, which are cheaper. The lake connections of these roads are soon felt, however.

Below is given the percentage of the total received by each route each month of the seven:

	N. Y. Central.	Erie.	Penna. roads.	Other roads.	By water.	Total.
January.....	41.2	24.5	27.9	3.6	2.8	100.0
February.....	42.4	27.8	23.6	2.2	4.0	100.0
March.....	53.4	27.6	15.6	1.3	2.1	100.0
April.....	48.8	33.3	13.8	0.4	3.7	100.0
May.....	35.9	18.0	14.3	0.1	31.7	100.0
June.....	35.7	19.0	8.1	0.1	27.1	100.0
July.....	34.3	14.9	10.3	0.1	40.4	100.0
Seven months.	40.8	22.7	14.8	0.8	20.9	100.0

But here too we need to compare the percentages of total rail receipts by each road, which are given below:

	N. Y. Central.	Erie.	Penna. roads.	Other roads.	Total.
January.....	42.4	25.2	28.7	3.7	100.0
February.....	44.1	29.0	24.6	2.3	100.0
March.....	54.5	28.2	16.0	1.3	100.0
April.....	50.7	34.0	14.3	0.4	100.0
May.....	52.6	28.3	20.9	0.2	100.0
June.....	53.7	30.2	12.9	0.2	100.0
July.....	57.6	25.0	17.3	0.1	100.0

The New York Central's percentage was largest in July, the Erie's in April, and the Pennsylvania's in January. As there has been much cutting of rates during this period, those who know "who begun it," or when any one company was supposed to be specially active in underbidding its rivals, may look for evidence in the above, though they must not confound the effects of natural causes, like the snow blockade, with those of underbidding in rates.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Morgan's Louisiana & Texas.—Extended from Jeanerette, La., northwest to New Iberia, 11 miles.

Valley, of Ohio.—Track laid from Akron, O., southward 10 miles, and from Akron, O., northward to Peninsula, 17 miles, making 27 miles in all.

Clarkburg, Weston & Glenville.—Extended from Turtle-town, W. Va., southward 9 miles. It is of 3-ft. gauge.

St. Paul & Sioux City.—Track has been laid on the *Fort Dodge Branch* from Crystal Lake, Minn., to Garden City, 8 miles. Also on the *Minnesota & Black Hills Branch*, from Heron Lake, Minn., west 10 miles.

This is a total of 65 miles of new railroad, making 1,187 miles thus far this year, against 941 miles reported for the corresponding period in 1878, 830 in 1877, 1,046 in 1876, 594 in 1875, 913 in 1874, 1,966 in 1873 and 3,372 in 1872.

A TRUNK-LINE PASSENGER COMBINATION has been substantially determined upon. The passenger agents have met with Mr. Fink, and the Trunk Line Executive Committee have considered the subject and have found no disagreements which stand in the way of dividing the traffic, or rather the earnings from the traffic; for this business, of course, cannot be transferred from road to road, as the freight is, at the will of the companies. The plan is to base the division on the business of last year, and to make a new division each year on the basis of the business of the previous year. On all passengers more than its proportion, the road carrying them will be allowed a very small proportion of the fare toward covering expenses. It is intended to make this so small that no road will be tempted to work for business for the sake of this proportion of the fare, and as small a part as 10 per cent. has been suggested. The most formidable obstacle so far met with is the difficulty of determining what traffic should be divided—what is strictly local and what competitive. On consideration, more and more of the passenger traffic appears to be competitive, and finally it was decided that it would be easier to designate what should not than what should be pooled. This task the passenger agents now have in hand, and there is a good prospect that the general plan proposed will be carried out at no distant day. Losses on passengers have doubtless not been so great as those on freight, but they have been considerable, and at many places nearly all the time there has been some cutting of rates, not much talked about, of which "scalpers" got the chief benefit, while at intervals there has been a general and sweeping reduction. Rates from St. Louis to the East have been wofully demoralized about half the time, though these "wars" did not always reach the trunk lines, and there has been a great deal more money wasted than most of us are aware of, the traveling public not getting the benefit of it in most cases.

DISCRIMINATING PASSENGER RATES have recently been adopted by one of the Coney Island roads—the Prospect Park & Coney Island—which certainly cannot be justified by the difference in cost of carriage, which is so often held up as the only justification of difference in rates, but which will doubtless have the very satisfactory result of yielding considerable additional advantages to the public and additional profit to the railroad company, and is a difference of the kind which is needed to develop passenger traffic in this country as freight traffic has been developed, but which it is usually very difficult to introduce. The business of the Prospect Park & Coney Island is, like that of the other Coney Island roads, wholly an excursion traffic. People ride down to the island for a bath or a few hours on the beach, and then home again, the run being only about 15 minutes by this road. Naturally, on week days, most of the travel is late in the day and in the evening, when men are usually at leisure. Then the frequent trains, if the day has been hot, are well filled; but until late in the afternoon either few cars are run or a large proportion of the seats are empty. The new arrangement is intended to fill these empty seats. From nine o'clock

in the morning until three in the afternoon going down and till six coming back excursion tickets are sold to ladies only at 15 cents, the rate at other times of the day, and to men at that time, being 25 cents. In the same hours, children from 5 to 12 get excursion tickets for 10 cents, instead of 15 cents, and no charge is made for children under five. The arrangement has but just gone into effect as we write, but it is reasonable to expect from it a large addition to the traffic of the road at hours when it can be handled with scarcely any addition to the expenses; and the class which will be brought out by this arrangement is just that which will profit most by a trip to the beach.

AMERICAN PASSENGER CARS are criticised by Mr. Lee in his paper on "Excursion Traffic" as being unsuited to the present circumstances of American roads, he thinking that smaller and lighter cars would be better. But it is remarkable that recently some of the leading English railroads have been introducing cars of the American system, so far as size and running-gear are concerned. It is a mistake to suppose that the necessity of a short wheel-base—shorter than can be had with a four-wheeled car—has disappeared with the improvement of permanent way in this country. Permanent way has been greatly improved, it is true, but the centre-bearing trucks are required primarily for running through sharp curves, and sharp curves are probably quite as common now as in the early days of American railroads—indeed, curves are used now that in those days were supposed impracticable with any kind of rolling stock—witness the Metropolitan Elevated in New York, with several curves of 90 ft. radius, through which nearly a thousand trains a day are run; European cars would leave the track at such a curve as certainly as they tried it.

But if we have trucks, then to get the least possible dead weight per seat we must make the car as large as possible, to divide the weight of the trucks by the largest number of seats. It is true that a car on trucks cannot be made with as little dead weight per passenger as a four-wheeled car, and there are certain advantages in small cars, though, we should say, not for excursion traffic. If cars can be kept for that traffic alone, however, they can be made very much lighter than ordinary passenger cars. But nowhere is there less disadvantage in heavy cars than in full trains, which excursion trains are supposed to be. It is when the 80,000 lbs. of car carries but 10 or 20 passengers that we are disgusted with its weight; when it carries 50 or 60 we don't much mind it.

THE PUBLIC INVESTMENTS of the first half of 1879 made in Europe are stated by the *Belgian Moniteur des Intérêts Matériels* to have been \$541,100,496, of which \$385,778,088 was in loans to nations and municipalities, \$41,039,000 to banking establishments, and \$114,283,398 to railroad and other industrial establishments. It credits America with \$6,554,000 loaned to governments and municipalities, and \$4,824,000 to railroads, etc. Nearly half of the railroad capital was raised for France—more than \$50,000,000. It is preparing to increase immensely its railroad system. Next follows Germany with \$21,000,000 for railroads, Great Britain and its colonies with \$14,000,000, and Italy with \$13,000,000. Probably in the United States in the same time as much as \$20,000,000 was invested in new railroads, but very little of this capital was raised by public subscription. Apparently this country now is able to supply the legitimate demand for capital from domestic resources, though the general public here seems to be as shy as that of Great Britain or Germany of new American railroad enterprises. Large capitalists, apparently, are supplying the money for new railroads at present. Small investors are now not generally asked to take bonds until the completion of the roads for which they are secured. But if capitalists complete a road, and hold it long enough to show that it can earn the interest on its bonds, they can usually sell the bonds so as to make a large profit. In this way the large capitalists who build the roads take all or the chief part of the risks, lose largely if they miscalculate as to the profitability of the road, and gain largely if they do not.

WATER RATES have advanced slightly during the past week, except on the canal, on which rates have been stationary at 6, 5½ and 3½ cents per bushel from Buffalo to New York for wheat, corn and oats, respectively. Lake rates were pretty steady until Tuesday last, when an advance of ¼ cent was reported, and quotations for Wednesday last are 4½ cent a bushel for corn and 5 for wheat from Chicago to Buffalo. Steamer rates from New York to Liverpool remained pretty steady at 7½d. per bushel until Tuesday, when there was an advance of ¼d., and on Wednesday 8½d. was the rate. The lake-and-canal rate from Chicago to New York is now about equivalent to 80 cents per 100 lbs., while the rail rate is 25 cents. The advance in water rates from Chicago to Liverpool since June 25 has been 17 cents a bushel on wheat—from 15 to 32 cents, the advance in steamer rates alone being 9 cents.

DIVISIONS OF TRAFFIC are now to be made at numerous places and to cover several kinds of business. The division of east-bound freight among the trunk lines, of the live stock at Chicago and other points, of Chicago east-bound freight, etc., are among them. By agreement, the division is to begin with Aug. 1, the apportionments that may be agreed upon or awarded by the arbitrators being adjusted to cover all the traffic from that date. The arbitrators are likely to have plenty of work directly. They cannot be said to have much just now—or had not a few days ago—because, like any other court, they cannot render decisions until cases have been presented and argued. Whenever a question is submitted for arbitration, the railroad companies must hand in printed arguments, and until that is done the arbitrators

can do nothing. So far, the companies, we understand, have been slow in presenting their arguments, but there are one or two cases, which are now before the arbitrators.

RAILROAD COMMISSIONS are now established in fifteen of the United States—Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, Virginia, South Carolina, Ohio, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri and California. In two other states, New York and Pennsylvania, quite full yearly reports are required of the railroad companies, the State Engineer and Surveyor receiving and compiling them in New York, and the Secretary of Internal Affairs (under the old constitution the State Auditor) in Pennsylvania. In New Jersey, and probably some other states, some kind of report is required. Only in Massachusetts and Connecticut of the New England states are any full statistics collected. The South Carolina commission was established very recently and has not had time yet to make a report.

THE RAILROAD CLAIM-AGENTS' CONVENTION will be held at the Girard House, Philadelphia, beginning at 10 a. m. Wednesday, Sept. 10 next. Every company is invited to send its claim agent or other person who investigates claims presented against it. Those who intend to be present are asked to give notice, as early as possible, either to the President, Mr. E. Darrach, of the Philadelphia & Reading Railroad, Philadelphia, or to the Secretary, Mr. A. L. Stokes, at the general freight office of the Kansas Pacific Railway, Kansas City, Mo.

THE ROADMASTERS' CONVENTION, which we announced last week as to be held the first Wednesday of September, will be held the second Wednesday, Sept. 10, at Niagara Falls.

Captain Eads' Project for a Ship-Carrying Railroad Across the Isthmus of Panama.

The *St. Louis Exporter and Importer* has published, with Captain Eads' recently published letter to the *New York Tribune* concerning this project, some letters from other engineers, among the most eminent in America, endorsing the plan. We give them altogether below:

CAPTAIN EADS TO THE NEW YORK TRIBUNE.

The Isthmus Canal Congress recently held in the city of Paris has presented to the civilized world all the results of the various surveys and estimates which have been thus far made. I believe in the effort to overcome the great barrier interposed by the American isthmus to interoceanic navigation.

The fact that the Congress comprised among its members many of the most able and distinguished engineers and scientists in Christendom, is at once an assurance that its estimates and opinions are entitled to the highest respect. From these it appears that the most economic solution of this great question, by means of a canal, must involve the expenditure of at least \$140,000,000, and possibly much more, and that the execution of the work will occupy from fifteen to twenty-five years from the time the work is commenced. These facts justify the conclusion: 1st. That the amount of capital required is so vast that it will not pay to execute the work with private means alone. 2d. That the amount cannot probably be obtained unless the governments of the several maritime nations directly interested in the work, can be induced to contribute liberally in aid of the enterprise. 3d. That the time required for consummating the work is so great that the enjoyment of the completed canal must necessarily be reserved to the next generation.

In view of these facts, is it not wise to carefully consider other engineering expedients which have been, or which may be suggested for the transportation of ships and their cargoes across the isthmus? It is, as I am informed, recommended by the Paris Congress, that the isthmus be cut down below the level of the two seas to such a depth as is needed for the passage of ships from sea to sea, and thus avoid the use of locks in the canal. To do this involves the construction of a tunnel four miles long through the Cordilleras, of such dimensions that the one under Mont Cenis dwindles into insignificance when compared with it. This method has been justly termed "the heroic treatment." The term, however, is not limited in its application, and suggests similar treatment to the Panama Railroad, or to some other road which may be constructed for transportation of the largest ships, with their entire cargoes, overland, from ocean to ocean.

My own studies have satisfied me of the entire feasibility of such transportation by railroad, and I have no hesitation in saying that for a sum not exceeding one-third of the estimated cost of the canal, namely, about \$50,000,000, the largest ships which enter the port of New York can be transferred, when fully loaded, with absolute safety across the isthmus, on a railway constructed for the purpose, within twenty-four hours from the moment they are taken in charge in one sea until they are delivered into the other, ready to depart on their journey.

HOW SPEED MAY BE RAISED.

On such a railway across the Isthmus, there need be no grades steeper than those on our chief lines of railroads, and the road-bed need not be over forty feet wide, nor have more than eight or ten rails laid upon it to sustain the car or cradle upon which the car is placed. The vessel should be lifted from the sea to the level of the road by a lock, or by other well-known hydraulic devices, and placed upon a car or cradle of ample strength to sustain the vessel with her cargo without the possibility of injury. The lock should be twice the length of the ship, and only one-half of its length should be deep enough to receive the ship from the sea. The bottom of the other half of the lock should be at the sea-level, and on this the railway should commence. Into this upper part of the lock the cradle to carry the ship should be run, and the gates at the land end should then be closed. The ship should then be floated into the deep end of the lock, and the sea-gates closed, after which water should be admitted to fill the lock to a height sufficient to float the ship on the car in the upper lift, after which the water should be drawn off and the gates of the land end opened, and the car and its burden be then started on its journey by rail. At the other end of the road the car should be run into a similar lock, the gates closed over the track, and those at the sea end of the lock closed also. This being done, the lock would be ready for filling, after which the ship could be floated off the car and be moved to the deep end of the lock. The water would then be allowed to escape from the lock, the ship lowered to the ocean level, the sea-gates opened, and the vessel would be then ready to re-sume her voyage in the other sea.

Another method of transfer between the sea and the railway, equally practicable and perhaps less expensive, would be to have a platform of iron of sufficient strength to sup-

port, first, a portion of the railway; second, the car or cradle to receive the ship, and third, the ship itself. This platform should be supported on each side by a row of large iron columns sunk into the bottom of the harbor and extending up above water to receive the hydrostatic cylinders with which the platform would be raised and lowered. By this hydraulic apparatus the platform should be lowered to a depth sufficient to permit the ship to be floated in over the railway car on the platform, after which the hydrostatic presses would lift platform, car and ship, until the railway track on the platform would correspond in height with and form an integral part of the railway extending across the Isthmus. The platform I have thus briefly endeavored to explain would simply be a huge elevator on which the terminus of the railway would be laid. Of course, such an elevator would be constructed in a harbor at each end of the railway. The purpose of such elevators would be to lift the ship out of the sea at one end of the route, and lower it into the sea at the other, and thus avoid using a steep grade into the sea, like the marine railways which are seen in almost every Navy yard. Many ships are very long, and any change of grade would have a tendency to strain them. Any perceptible change of grade must therefore involve devices to prevent such straining, and these devices it is desirable to avoid. For the same reason curves in such railway should be avoided. If a change of direction be absolutely necessary it can be managed by a turn-table at the locality where a change of alignment is desirable. The avoidance of curves would greatly simplify the construction of the car on which the ship is to be transported. This car would probably be formed by joining several separate sections together, according to the length of the ship. Each separate section would probably be 100 feet long and be supported by about 200 wheels, some of which should be drivers, actuated by propelling engines. Rubber or steel springs should be interposed between the axles of the wheels and the car. Each section of the car or cradle that carried the ship would really constitute a locomotive. The propelling engines would be placed on each side, at such a height as to prevent submergence when the car would be sunk on the elevator or in the locks. The weight of the largest merchant steamers and their cargoes would not exceed 10,000 tons, and such a one would be carried on a cradle composed of five such locomotives. These would have about 1,000 wheels, bearing on eight or ten rails with a pressure of about twelve tons to each wheel. This is only twice as much as the pressure on the rails under the driving wheels of the locomotive of an express train. The total weight of ship, cargo and cradle would be distributed over an area of road-bed 40 feet wide by 500 feet long, and would be only 1,200 pounds per square foot, allowing 2,000 tons for the weight of the car. This is not half the pressure on the earth under each tie when each pair of the driving wheels of an ordinary locomotive passes over it.

GREATER SPEED THAN IN A CANAL.

On moderate grades an ordinary freight locomotive will pull about fifty loaded cars from fifteen to twenty miles per hour. The weight of the cars and their load is about 1,000 tons, and this is carried on about 400 wheels. Hence the largest ship and her entire cargo should not require more than the power of a dozen such locomotives to move it at the same speed over similar grades. From this it must be evident that the ship once safely placed on a properly constructed car, adjusted to the railway of a substantial and well-ballasted road-bed, can be moved with certainty and ease at a much higher rate of speed than would be safe in the very best canal that has been proposed. I would, however, not expect to use a higher rate of speed on a ship railway than eight miles per hour.

The practicability of lifting the heaviest ships out of water with perfect safety on cradles adjusted to receive them, is illustrated in every dock-yard in the country, and one of the methods I have referred to as being a huge hydraulic elevator, has been put to a practical test. A dry-dock was constructed upon this principle in England a few years ago, and sent to the East Indies, by which ships placed over a platform sunk to receive them are lifted vertically out of water by hydraulic pumps.

Of course, the works and devices required for the successful operation of a ship railway should be of the most substantial character, and the elevating machinery should be of such strength and power as to make the transfer of the ship from the railway to the sea, and from the sea to the railway, a matter of perfect safety and dispatch.

The actual cost of operating such a railway would be, I think, considerably less in proportion to the tonnage moved over it than that of the most successful railway line in this country, for the reason that the tonnage carried would be handled by machinery exclusively, and the ratio of paying cargo to non-paying weight would be much greater. The cost of maintenance in proportion to the tonnage carried should be much less also. This result may be safely anticipated because the railway would be very substantial and durable, and very short compared with the magnitude of the tonnage carried; the machinery would also be very simple in character, and the ratio of cost of maintenance to gross receipts would therefore be proportionately reduced. But even if we assume that the operating expenses and maintenance be equal to one-half of the gross receipts, it will be seen that a ship railway will be a much more profitable investment than a canal, even if it cost half the price of the canal, whereas it should not cost more than quarter as much. The gross receipts must be the same in either case, and the railway can be completed in three or four years, while it is safe to assume that the canal will require five times as long. The interest on the canal investment before completion would therefore be enormously greater than that on the railway. A single-track railway, with provisions for side tracks to enable the cars to pass each other at proper points on the road, would, I think, be ample to meet the demands of commerce at the Isthmus for many years to come.

JAMES B. EADS.

PORT EADS, La., June 10, 1879.

MR. OCTAVE CHANUTE TO CAPTAIN EADS.*

NEW YORK, June 28, 1879.

MY DEAR SIR: I am much pleased to find in this morning's *Tribune* your very able and clear presentation of a scheme for a marine railway, across the Isthmus; the rather as I gave some attention to the subject myself, nearly a year ago, and reached conclusions almost absolutely identical with yours, as to the feasibility and general features of the project.

As there are, however, some differences in our details, I send you my views, in the hope that they may be of service.

1st. The main feature of the plan is the cradle. I had reached the conclusion that it would be better to make it of one section, or to connect the several sections together with equalizing levers, in order to avoid straining the ships in transit.

I also concluded that it should rest on not less than 2,000 wheels. We find, in railway practice, that it is not advisable to put more than 6½ tons on a wheel, and even this we restrict to the locomotive drivers. With this weight, we find

the pressures on the surfaces in contact between wheel and rail, to be from 45,000 to 80,000 lbs. per square inch, or quite up to the initial crushing point of steel. One engine which we have, with seven tons per wheel, we have been compelled to lay up, because of the destruction she inflicted on the rails. Car wheels we load up to three tons each, and this gives us pressures of 20,000 to 40,000 lbs. per square inch. I had, therefore, determined that, estimating the weight of the vessel and cargo at 8,000 tons, and of the cradle and machinery at 2,000 tons, say 10,000 tons in all, it would be advisable to sustain them on 500 trucks of four wheels each, a total of 2,000 wheels, with an average load of five tons each.

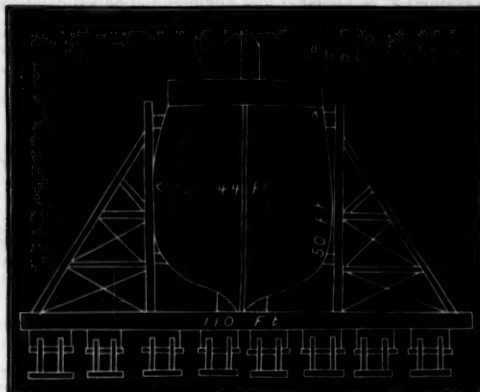
To carry these wheels, I think we should have eight parallel tracks, 13 ft. between centres, or 96 ft. over all; and the cradle should be 500 ft. long, 50 ft. high, and 44 ft. wide inside, with a total base of about 110 ft., as shown in cross section herewith. The trucks would be about 8 ft. apart between centres, longitudinally of the cradle, and 13 feet transversely.

The plan which you propose of turn-tables 500 ft. long does not strike me favorably. They would be a great source of expense, delay and vexation. It would be better, in my judgment, to make the turn-table a part of the cradle, by giving the trucks a *traversing motion* at right angles with the axis of the cradle, sufficient to enable them to assume the proper position on the chord sustaining the curves adopted, for a length equal to that of the cradle. This can be done either by introducing a roller between the truck and the cradle, or by suspending the axles from links, as is done in the swing-beam trucks, which are largely used on railroads.

I am inclined to believe that the first solution would be the better one, although a final decision would probably have to be based upon the result of surveys, to determine the actual radius of the curves required.

2d. Next to the design of the cradle, harbors and receiving docks are most important; and upon these points I had reached quite the same conclusion with yourself, finally settling upon the double lock, instead of the hydraulic lift, as preferable, if the location admits of it. I am glad to find that I agree with one more competent than myself in these respects.

3d. The construction of the roadway and tracks does not seem to present any marked peculiarity. Beyond the great width of 118 to 125 ft. required (to be increased upon curves



to admit of the swing of the cradle, and the requirement that all bridges and crossings shall be under grade, I see no great difficulty.

I satisfied myself that grades of one per cent., or 52.8 ft. per mile, would have to be employed. Upon this the resistance from gravity would be 20 lbs. per ton, and if we assume 10 lbs. more for curves, wheel friction, etc., we have a maximum of 30 lbs. per ton, or a resistance of 300,000 lbs. to overcome, requiring, at any ten miles an hour, about 8,000 horse-power, which will need to be applied to say 300 wheels, if we assume an adhesion of one-tenth of the instant weight; ordinary locomotives working up to one divided by four and ½ in summer and ½ in winter.

I see no reason why the railway should not be worked at 10 miles per hour, and, assuming it to be 60 miles long, why a steamer can not be transferred from ocean to ocean in twelve hours, instead of the twenty-four you estimate.

The cost of working should not be over one-fourth of a cent a ton a mile, if we include the weight of the vessels and cradle, or three-fourths of a cent a ton a mile, if we include their contents alone.

Assuming, as did the commission, a traffic of 6,000,000 tons annually, the operating expense would therefore be \$2,700,000 a year, while the estimated earnings were \$18,000,000.

Assuming, however, as would be much safer, a traffic of 3,000,000 tons annually, and a revenue of \$6,000,000 (\$2 a ton, instead of \$3), the expenses would be, say, \$1,350,000, and the net returns \$4,650,000, which would pay handsomely.

I shall be glad to learn that you are pursuing the subject. Respectfully,

O CHANUTE.

MR. C. SHALER SMITH TO THE ST. LOUIS EXPORTER AND IMPORTER.

ST. LOUIS, July 28, 1879.

DEAR SIR: In response to your note of this date asking my opinion as to the practicability of a marine railway across the Isthmus of Panama, I have to say:

First, that the only question in doubt is one of finance. The engineering problems involved have all been solved on a smaller scale, in the construction of various works in this country and in Europe, during the past thirty years, and the adaptation of these tried and proved principles of mechanical design to the case in hand is not by any means difficult.

Next, as to the location. Between Aspinwall and Panama a line can be had, only 46 miles in length, and with a maximum summit of but 285 ft. above low tide at Aspinwall. Only surveys made especially for the purpose can show whether a better line can be had than this; but these facts are sufficient to show that Capt. Eads was correct in stating that fifty millions of dollars would fully cover the outlay.

I give this topographical data on the authority of Mr. Williams, one of the engineers engaged in the surveys of the Panama Railway.

Next. Construction of the landing and lifting docks. At Panama the tide rises 20 to 25 ft. Here a large receiving dock, at which vessels would be admitted only at high tide, and with room for fifteen or twenty ships at once, would probably be best. During the intervals between the tides, ships would be delivered to, and received from, this dock by the railway. It is probable, also, that this rise and fall of the tide could be utilized in furnishing the necessary power for the manipulation of the caissons.

The tidal variation at Aspinwall is only about eighteen inches; therefore, at that point the entire lift would have to be made by supplied power. It is probable that the best

forth of lifting dock would be a caisson with gates at both ends, and running on an inclined plane into a landing dock. The tracks at the bottom of this caisson would correspond with the tracks of the railway proper. Into this caisson the cradle would be run, and then the caisson itself would be allowed to run down the incline into the landing dock until deep enough to permit the vessel which is to be moved to sail into it. The gates would then be closed, and the caisson containing cradle, water, and vessel, drawn up the incline to the necessary point, the water let out, the cradle adjusted, and the vessel is then ready for the overland trip.

Colonel Henry Flad, in a published conversation on the subject, proposed to carry the caisson, thus filled with water, entirely across from ocean to ocean, but as this would add some 6,000 tons to the weight to be transported, the system would need to be carefully examined before adoption on so large a scale.

In 1867 I made a plan for a ship railway and inclined plane for the purpose of transporting vessels from Lake Erie to Ontario around the falls on the American side; and for vessels of the size used on the lakes, I found the caisson system decidedly the best, and fully as economical as the use of the cradle.

A good example of the successful use of the inclined plane and movable caisson is to be found at Georgetown, D. C., where the connection between the Chesapeake & Ohio Canal and the Potomac River is made in this manner.

Next. The construction of this cradle. This would require much study; but my preference would be for hanging the ship in slings composed of woven bands of steel wire rope, five feet wide and one inch thick, so as to be perfectly flexible; these would be connected with the cross-heads of a number of hydrostatic presses, placed along the cradle and connected together by a pipe common to all, so that the ship would be always carried on an even keel, the same as though floating in a caisson.

If the curves can be made not less than 12,000 ft. radius, the cradle trucks can be constructed so as to provide for the necessary lateral motion without difficulty, but if sharp curves must be used, Captain Eads' excellent suggestion of a large turn-table is perfectly practicable.

Next. The construction of the track. At least ten parallel tracks of 3 ft. gauge, with rails not less than 6 in. in height, and tracks 10 ft. apart, would be needed. This will give a total wheel base of 93 ft. by, say, 460 ft., for the largest cradle. Using a high rail with broad tread it will be safe to load to 5½ tons per wheel for the average load. Assuming the greatest load to be 9,500 tons, we have 432 trucks, or 1,728 wheels needed.

Next. As to method of applying power for the transportation of the cradle. I am inclined to think that the Belgian wire-rope towing system is the best. If possible, level grades should be carried up to the base of the summit hills, and then by concentrating all the grades at one point the cradles could be moved over the summit by powerful stationary engines. If the summit can be passed, however, with a maximum grade of 20 ft. per mile, then movable engines, drawing the cradles and themselves by steel wire towlines, laid in the middle of each track, and passing over and grasped by "Fowler clip pulleys" attached to each engine, will be the most economical method of locomotion in all probability. The power needed to transport the greatest load, with curves of 12,000 ft. radius and grades of 20 ft. per mile, would be 200,000 lbs., requiring steel ropes of 1½-in. diameter each. However, as these would form a costly part of the outfit, the relative economy between this system and that of the locomotive engine, for this peculiar service, can only be determined by exact calculations.

Lastly. Would the enterprise pay? I think it would, most undoubtedly. If pressed forward at once it can be in operation at least five years sooner than the canal, and will have demonstrated its advantages before the latter is opened. Assuming M. de Lesseps' estimate of \$8,500,000 annual earnings as correct, and the average railroad proportion of expenses to receipts (60 per cent.) as also holding good, we still have a net income of \$3,500,000, or 7 per cent. on the capital, after allowing for a perpetual renewal and repair.

To conclude. It will be a serious reflection on the enterprise of American capitalists, the science of American engineers, and the patriotism of American statesmen, if foreign capital and foreign skill are to perform the work of severing our continents and then pocketing the profits of an enterprise, most of the cost of which must eventually be paid by our citizens in the shape of tolls upon our bi-oceanic coasting trade. Yours truly,

C. SHALER SMITH.

MR. HENRY FLAD TO THE EXPORTER AND IMPORTER.

DEAR SIR: In reply to your request that I give my views in regard to the ship railway proposed by Capt. James B. Eads, I beg to state my opinion:

1. That the first cost of the construction of a ship railway will not be one-fourth of that of a ship canal.

2. That a ship railway can be constructed in probably one-third of the time required to construct a ship canal.

3. That ships can be transferred on such a railway with absolute safety, and with the same dispatch as through a ship canal.

4. That the cost of maintenance will be less for the railway than for the canal.

5. That although the cost of transferring ships by ship railway will exceed that of passing them through a ship canal, the difference will be insignificant compared with the saving of interest on the first cost.

6. That the ship railway will therefore offer a better and safer investment for capital.

I will add that I have taken some pains to inform myself in regard to the surveys and estimates for ship canals which have heretofore been made, and that I have also made careful yet liberal estimates of the cost of construction, maintenance and operation of a ship railway, and would give you an abstract of the facts and figures on which I base the opinion given you, but I find that a full discussion, covering all the points, would require more space than you could allot me in this number of your valuable journal.

Very respectfully,

HENRY FLAD, C. E.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Mail Service Extensions.

Mail service has been ordered over railroad lines as follows:

Atchison, Topeka & Santa Fe, service ordered over the *Kansas City, Emporia & Southern Branch* from Emporia, Kan., to Eureka, 47 miles; to begin Aug. 15.

Dividends.

Dividends have been declared as follows: *Illinois Central*, 3 per cent., semi-annual, payable Sept. 1. Transfer books close Aug. 13.

New York, Providence & Boston, 2 per cent., quarterly, payable Aug. 11.

Syracuse, Birmingham & New York, 2 per cent., payable on demand.

Cleveland & Pittsburgh (leased to Pennsylvania Company), 1½ per cent., quarterly, payable Sept. 1.

* The following are extracts from a private letter to Capt. Eads which the *Exporter and Importer* was permitted to publish.

Foreclosure Sales.

The *International & Great Northern* road was sold in Austin, Tex., July 31, and bought for \$1,000,000 by George Sealey, representing the trustees for the bondholders. The road was sold under separate decrees, one of the first mortgage on the 253 miles of the former Houston & Great Northern, and the other on the 296 miles of the former International road. The property as a whole includes 519 miles of road, upon which there were first mortgages amounting to \$7,848,000, and subordinate bonds amounting to \$4,959,000. A plan of reorganization, in which all the bonds are recognized, was agreed on some time ago.

The *Iowa, Minnesota & North Pacific*, better known as the *Newton & Monroe* road, was sold at sheriff's sale recently under a mechanic's lien for labor and materials furnished by F. H. Griggs, of Davenport, Ia. Bought in for \$8,000 by Mr. Griggs, who will, it is said, transfer it to the Rock Island road. It is 18 miles long, from Newton, Ia., to Monroe, and reaches some coal mines.

The *St. Louis, Keosauqua & St. Paul* road was sold at sheriff's sale at Keosauqua, Ia., July 26, and bought for \$5,100 by Wm. Brownell, of Keokuk, Ia., as trustee for certain lienholders. It is of 3-ft. gauge and four miles long, from Keosauqua, Ia., to Summit. It has not been worked for some time.

The *Greenwich & Johnsonville* road was to be sold at referee's sale, Aug. 7. It is 14 miles long, from Greenwich, N. Y., to Johnsonville, and has a bonded debt of \$185,500.

The *Logansport Crawfordville & Southwestern* road will be sold Sept. 19, under foreclosure of mortgage. It has a funded debt of \$1,500,000 first and \$500,000 second-mortgage bonds. The owned line extends from Logansport, Ind., to Rockville, 93 miles, and an extension from Rockville to Terre Haute, 22 miles, is leased. It has not been a valuable property, barely earning working expenses and rental.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point.—At the annual meeting in Atlanta, Ga., July 25, the following directors were chosen: John P. King, C. H. Phinixy, J. L. Yancey, J. Hill, D. N. Speer, W. B. Berry, J. H. Bigby. The board re-elected John P. King President; L. P. Grant, Superintendent; W. P. Orme, Secretary and Treasurer.

Central Pacific.—At the annual meeting of this company's leased and controlled lines in San Francisco July 23, the following officers were chosen: *Amador Branch.*—Leland Stanford, President; C. P. Huntington, Vice-President; E. W. Hopkins, Treasurer; J. O. B. Gunn, Secretary. *Berkeley Branch.*—Leland Stanford, President; C. P. Huntington, Vice-President; E. W. Hopkins, Treasurer; J. O. B. Gunn, Secretary. *California Pacific.*—R. P. Hammond, President; George E. Gray, Vice-President; J. L. Willcutt, Treasurer; R. P. Hammond, George E. Gray, J. L. Willcutt, C. F. Crocker, J. O. B. Gunn, W. V. Huntington, H. T. Smith, Directors. *Los Angeles & San Diego.*—Charles Crocker, President; Charles F. Crocker, Vice-President; N. T. Smith, Treasurer; C. P. Huntington, Secretary. *Market Street.*—Leland Stanford, President; Charles Crocker, Vice-President; N. T. Smith, Treasurer; J. L. Willcutt, Secretary. *Mission & Bay Bridge.*—Leland Stanford, President; Charles Crocker, Vice-President; N. T. Smith, Treasurer; J. L. Willcutt, Secretary. *Northern.*—W. V. Huntington, President; C. P. Huntington, Vice-President; Leland Stanford, Treasurer. *Potrero & Bay View.*—Leland Stanford, President; Charles Crocker, Vice-President; N. T. Smith, Treasurer; J. L. Willcutt, Secretary. *Sacramento & Placerville.*—Leland Stanford, President; C. P. Huntington, Vice-President; E. W. Hopkins, Treasurer. *San Pablo & Tulare.*—Leland Stanford, President; Charles Crocker, Vice-President; E. W. Hopkins, Treasurer. *Stockton & Copperopolis.*—Leland Stanford, President; Charles F. Crocker, Vice-President; E. W. Hopkins, Treasurer; J. O. B. Gunn, Secretary. *Terminal.*—Leland Stanford, President; C. P. Huntington, Vice-President; E. W. Hopkins, Treasurer; J. O. B. Gunn, Secretary.

Central of New Jersey.—Mr. G. H. Stearns has been appointed Assistant General Freight Agent, in charge of the freight business of the Lehigh & Susquehanna Division, with office at Mauch Chunk, Pa. He has been for years in the general freight office in New York.

The following officers are announced for the New Jersey Southern lines now operated under lease: James Moore, General Superintendent and Engineer; W. S. Sneden, Assistant General Superintendent in charge of the division; R. Blodgett, Superintendent and Master Mechanic; Samuel Knox, Secretary and Treasurer; J. W. Watson, Comptroller; H. P. Baldwin, General Passenger Agent; P. H. Wyckoff, General Freight Agent; W. J. Parmentier, Assistant General Freight Agent. Messrs. Moore, Knox, Watson, Baldwin and Wyckoff are the general officers of the Central; Messrs. Sneden, Blodgett and Parmentier are the old officers of the Southern road.

Central Vermont.—Col. G. W. Bentley has been relieved from duty as General Manager, but retains his former position as General Superintendent of the New London Northern Division. Reports, etc., heretofore made to the General Manager, will be sent to the General Superintendent, J. W. Hobart, at St. Albans, Vermont.

Chicago, Burlington & Quincy.—Mr. W. F. Moore has been appointed Division Freight Agent at Quincy, Ill., in place of W. R. Crumpton, transferred. Mr. Moore has been Agent in Chicago.

Mr. W. R. Crumpton is appointed Assistant Superintendent of the St. Louis & Rock Island Division, with office in St. Louis.

Chicago & Lake Huron.—The officers of the Eastern Division are: Joseph Hickson, Trustee for purchasers; Chas. B. Peck, General Manager; Henry Funnell, Superintendent; G. W. Prescott, Master Mechanic; W. F. Vanderburg, Cashier. The office of the Trustee is at Montreal, P. Q.; the other offices at Port Huron, Mich.

Chicago & Northwestern.—The following officers are appointed for the Des Moines Division, late the Des Moines & Minneapolis road: Superintendent, J. S. Oliver, Clinton, Ia.; Assistant Superintendent, J. J. Smart, Des Moines, Ia.; Engineer, John J. Berry, Des Moines, Ia. Mr. Oliver is also Superintendent of the Iowa Division.

Des Moines & Marshalltown.—This company has been organized with the following directors: Thomas Mitchell, Mitchellville, Ia.; Henry Fitzhugh, Coalbank, Ia.; George Glück, N. Morley, Marshalltown, Ia.; R. T. Rathburn, R. E. Stevens, Marion, Ia.; J. S. Clarkson, F. M. Hubbell, Jefferson S. Polk, Des Moines, Ia.; S. S. Merrill, John Plankinton, Milwaukee, Wis. The board elected J. S. Clarkson, President; R. T. Rathburn, Vice-President; F. M. Hubbell, Secretary; Jefferson S. Polk, Treasurer.

Illinois Central.—Mr. Thomas H. Wright is appointed Train-Master of the Iowa Division, West (Cedar Falls & Minnesota Junction to Sioux City), in place of H. C. DePue, transferred. His office will be at Ft. Dodge, Ia. Mr. H. C. DePue is appointed Agent at Cairo, Ill., relieving the Gen-

eral Southern Agent of all duties connected with Cairo station.

Indiana, Bloomington & Western.—It is reported that Mr. B. S. Henning is to take charge of this road as General Manager.

Indianapolis, Decatur & Springfield.—Mr. George A. Sanderson has been appointed General Freight and Ticket Agent, in place of Charles V. Lewis, resigned.

Kansas & Southwestern.—The first board of directors is as follows: Jay Gould, Sidney Dillon, Russell Sage, F. L. Ames, S. H. Clark, S. T. Smith, T. J. Lynde, D. B. Powers, S. M. Palmer, A. W. Wickham.

Lake Erie & Louisville, of Indiana.—This company has been organized with the following directors: Daniel P. Eels, Muncie, Ind.; C. R. Cummings, Pekin, Ill.; Calvin S. Brice, Lima, O.; Charles Foster, Fostoria, O.; Watson H. Brown, E. H. R. Lyman, George J. Seney, New York.

Leavenworth & Southwestern.—The first board of directors of this new company is as follows: Alexander Caldwell, Paul E. Havens, L. T. Smith, Lucien Scott, Levi Wilson, Leavenworth, Kan.; D. H. Garrison, Oliver Garrison, St. Louis; Cornelius K. Garrison, Wm. R. Garrison, New York.

Long Island.—The following circular is dated Aug. 1:

"Mr. J. Chittenden, General Freight and Passenger Agent having resigned, Mr. H. M. Smith has this day been appointed General Agent and placed in charge of the general freight business of the company. All correspondence heretofore addressed to the General Freight Agent regarding freight matters will in future be addressed to the General Agent at Long Island City, N. Y. All correspondence regarding the passenger business of the company will in future be addressed to Mr. S. Spencer, General Superintendent."

"Mr. Wm. Dalzell, Jr., has this day been appointed Agent at Long Island City vice Mr. H. M. Smith transferred."

Louisville & Nashville.—A circular from this company announces that from Aug. 1 the jurisdiction of the following officers of this company will be extended over the former St. Louis & Southeastern lines from Henderson, Ky., to Nashville, Tenn., now to be known as the Evansville, Henderson & Nashville Division: G. C. Breed, Assistant to the General Manager; D. W. C. Rowland, General Superintendent Transportation; F. de Funiak, Chief Engineer and Superintendent Machinery; E. B. Stahman, General Freight Agent; J. M. Culp, Assistant General Freight Agent; C. P. Atmore, General Passenger and Ticket Agent; Cushman Quarrier, Comptroller; Wm. W. Thompson, Cashier and Paymaster; H. T. Curd, Auditor; C. B. Simmons, Treasurer; R. S. Lukenbill, Inspector of Agencies; J. T. Gallagher, General Baggage and Lost Car Agent.

The following circular is dated July 29:

"James Montgomery, Superintendent Memphis Line, will take charge of the Transportation Department of the Second Division, Main Stem—Bowling Green to Edgfield Junction. All employees of Transportation Department within this district, will report to and receive instructions from him."

"James Goddes, Superintendent Nashville & Decatur Division, is appointed to the additional office of Superintendent of Transportation, Road and Machinery Departments of the Evansville, Henderson & Nashville Division—Henderson to Nashville. These appointments to take effect Aug. 1, 1879."

Manhattan & Big Blue Valley.—This company has been organized with the following directors: N. A. Adams, George M. Higginbottom, E. B. Purcell, Manhattan, Kan.; J. B. Anderson, Junction City, Kan.; George R. Peck, Topeka, Kan.; George T. Anthony, Leavenworth, Kan.; H. C. Nutt, Chicago; E. W. Converse, S. Morse, John H. Sanborn, George B. Wilbur, Boston.

Memphis & Charleston.—The general offices have been removed to Huntsville, Ala., where they will remain until further notice.

Middlesex Central.—At the annual meeting in Boston, July 31, the following directors were chosen: Nathan Caruth, Nathan Cushing, Jacob Edwards, William H. Hill, Jr., George Keyes, S. W. Richardson. The road is leased to the Boston & Lowell.

Mineral Range.—The new board has re-elected Charles E. Holland, President; R. M. Hoar, Vice-President; A. H. Vile, Secretary and Treasurer.

Minneapolis & St. Louis.—Mr. W. W. Rich has been appointed Chief Engineer. He was formerly on the Wisconsin Central, and has been for some time in governmental service. Mr. A. B. Hode, General Freight and Ticket Agent, has been appointed Treasurer and Auditor also, in place of M. P. Hawkins, resigned.

New York & Long Island Bridge.—The board has elected Dr. Thomas Rainey, President; R. M. C. Graham, Secretary; H. D. Schmidt, Treasurer.

Philadelphia & Atlantic City.—Mr. J. S. Verts has been appointed Assistant Superintendent; Frank S. Ure, Cashier. Offices in Camden, New Jersey.

Portsmouth & Dover.—At the annual meeting in Portsmouth, N. H., Aug. 4, the following directors were chosen: A. R. Hatch, Frank Jones, Daniel Marcy, W. H. Sise, Chas. H. Sawyer, Oliver Wyatt, Andrew H. Young. The board elected Frank Jones, President; George L. Treadwell, Treasurer. The road is leased to the Eastern.

Rochester & State Line.—At a meeting held in New York, July 29, the board elected E. D. Worcester, President; E. D. Worcester, Augustus Schell, Samuel F. Barger, Cornelius Vanderbilt, W. K. Vanderbilt, Executive Committee. The road is controlled by the directors of the New York Central & Hudson River Company.

St. Louis & San Francisco.—Mr. A. Graydon has been appointed cashier, in place of F. F. Randolph, resigned.

Mr. Wm. H. Yeaton has been appointed Assistant Land Commissioner.

St. Louis, Shelbyville & Eastern.—The first board of directors is as follows: D. W. Marks, Shelbyville, Ill.; James Davis, R. H. Davis, Ridge Farm, Ill.; Isaac Porter, W. E. Livingston, Danville, Ill.; Cary E. Evans, Delphos, O.

St. Paul, Minneapolis & Manitoba.—The following appointments are announced by circular from this company: J. C. Morrison, Purchasing Agent, with headquarters in St. Paul, Minn. All purchases of supplies and materials and all sales of old materials will be made by him.

J. C. Munroe, Master Mechanic, in place of C. F. Ward, resigned. Appointment took effect July 23.

H. V. Dougan, Car Service Agent. All car-service reports will be addressed to him.

A. Guthrie, Train-master of that part of the company's lines heretofore known as the First Division, St. Paul & Pacific. He will have exclusive charge of train-men and train supplies, and agents will respect his instructions as to business of stations.

J. B. Cable, Train Dispatcher of the same lines.

Southern Pacific.—At the annual meeting in San Fran-

cisco, July 23, the following directors were chosen: Charles Crocker, Charles F. Crocker, W. V. Huntington, Charles Mayne, H. M. Newhall, N. T. Smith, J. L. Willcutt. The board re-elected Charles Crocker President; Charles F. Crocker, Vice-President; J. L. Willcutt, Secretary; N. T. Smith, Treasurer.

Springfield, St. Louis & Sidney.—At the annual meeting, July 24, the following directors were chosen: D. P. Jeffries, P. P. Mast, Springfield, O.; Samuel Bowerstock, E. H. Furrow, S. T. McMoran, St. Louis, O.; F. E. Hoover, S. A. Lecky, Jacob Piper, W. H. Taylor, Sidney, Ohio.

Taylor's Falls & Lake Superior.—This company has been reorganized by the election of several new directors, and the board is now as follows, Levi W. Folsom, Oscar Roos, Geo. W. Seymour, Taylor's Falls, Minn.; John Martin, Franklin Steele, C. C. Washburn, W. D. Washburn, Minneapolis, Minn. This board has elected John Martin President; Levi W. Folsom, Vice-President; C. F. Hatch, Secretary; George W. Seymour, Treasurer; H. N. Setzer, Attorney.

Terre Haute & Southeastern.—The officers of this company, successor to the Cincinnati & Terre Haute, are: W. B. Tuell, President; George Atherton, Superintendent; J. R. Kendall, General Freight Agent. Offices at Terre Haute, Ind.

Toledo, Peoria & Warsaw Railway Employees Protective Association.—This association has been organized with the following officers: President, W. O. Hewitt; Secretary, F. L. Tompkins; Treasurer, Theodore Higbee; Directors, W. F. Merrill, Theodore F. Kent, R. M. Griswold, C. L. Burlin, game, H. G. Byron, C. E. Rians.

PERSONAL.

—Mr. J. Chittenden has resigned his position as General Freight and Passenger Agent of the Long Island Railroad.

—Mr. Charles Graham, Master Mechanic of the Bloomsburg Division of the Delaware, Lackawanna & Western Railroad, was presented with a valuable gold watch and chain by the employees of the road and other friends, at Wilkesbarre, Pa., July 30. The presentation took place in the car-shop, and was the occasion of several speeches very complimentary to Mr. Graham personally and to his 15 years' management of the mechanical department of the road. The occasion was a very pleasant one.

—Mr. C. F. Ward has resigned his position as Master Mechanic of the St. Paul, Minneapolis & Manitoba (late St. Paul & Pacific) Railroad.

—Mr. George Westinghouse, Jr., of the Westinghouse Brake Co., has returned from Europe. During his three years' stay abroad he has gained about 75 pounds in weight and has acquired a slight English accent.

—Mr. F. F. Randolph, for the past three years Cashier of the St. Louis & San Francisco Company, has resigned that position to accept a position in the banking house of John Munroe & Co., Paris, France.

—Mr. Joseph Ramsay, Jr., has resigned his position as Chief Engineer of the Pittsburgh, New Castle & Lake Erie Railroad.

—Mr. W. S. C. Otis, one of the oldest and most prominent citizens of Cleveland, O., died of paralysis at his residence in that city, July 31, aged 70 years. He was born at Cummington, Mass., graduated from Williams College and went to Ohio, where he studied law. He practiced in Ravenna and afterward in Akron until 1854, when he was chosen Vice-President of the Cleveland & Pittsburgh Company, and removed to Cleveland. In 1855 he was chosen Solicitor of the company, and retained that office until 1876, when failing health forced him to retire from active life.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Six months ending June 30:

	1879.	1878.	Inc. or Dec.	P. c.
At., Miss. & Ohio.....	\$715,486	\$761,810	D.	\$46,324 6.1
St. Paul & Sioux City.....	302,153	285,113	I.	17,040 6.0
Sioux City & St. Paul.....	159,738	179,713	D.	19,975 11.1
Southern Minnesota.....	265,328	373,983	D.	108,655 29.1

Month of May:

Del. & Hud. Canal Co., leased lines.....	\$381,532	\$331,521	I.	\$50,011 15.1
Net earnings.....	125,326	114,864	I.	10,462 9.0

Month of June:

At., Miss. & Ohio.....	\$102,247	\$120,094	D.	17,847 14.9
Great Western.....	371,000	373,500	D.	2,500 0.9
Net earnings.....	48,000	54,000	D.	6,000 10.1
St. Paul & Sioux City.....	54,572	46,837	I.	7,735 16.5
Sioux City & St. Paul.....	28,589	29,054	D.	465 1.6
Southern Minnesota.....	52,791	53,624	D.	833 1.6

Month of July:

St. Louis, Iron Mt. & Southern.....	\$334,800	\$299,161	I.	\$35,639 11.9
Union Pacific.....	1,068,050	837,972	I.	230,078 21.9

Week ending July 18:

Great Western.....	\$75,193	\$88,313	D.	\$13,120 14.8
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Week ending July 28:

Grand Trunk.....	\$154,503	\$147,864	I.	\$6,639 4.5
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Coal Movement.

Coal tonnages for the week ending July 26 are reported as follows:

	1879.	1878.	Increase.	P. c.
Anthracite.....	552,563	469,918	82,675	17.6
Semi-bituminous.....	92,067	78,062	14,005	18.7
Bituminous, Pennsylvania...	38,643	26,375	12,268	46.5
Coke, Pennsylvania.....	27,901

The operators in the Schuylkill anthracite region are trying to arrange for a stoppage of production for two weeks in August, but it is hardly possible that all the companies will agree to it.

The anthracite companies are at cross-purposes as to prices. The Reading's August circular announced an increase, and the Delaware, Lackawanna & Western auction sale also showed an increase; but the Pennsylvania Coal Company makes no change, and the Delaware & Hudson announces a reduction in prices at tide-water for August.

Semi-bituminous tonnage for the week is large, partly because the Cumberland companies are making large shipments by canal. The Pennsylvania bituminous tonnage also shows a large increase, due to the better condition of the iron trade.

The shipments of the Tennessee Coal & Railroad Company from its Sewanee mines in July were 5,052 tons coal and 217,014 bushels coke. Compared with July, 1878, there was a decrease of 1.8 per cent. in coal, and an increase of 146.8 per cent. in coke. These shipments go over the Nashville, Chattanooga & St. Louis road.

Delaware Fruit Traffic.

Scattering shipments of peaches have been coming up the Delaware Railroad for a week or more, but the first heavy shipments were made Aug. 4, when 125 car-loads were sent out, of which 58 were bound to New York and 43 to Philadelphia. Shipments since then continue large.

floating which will probably be found are the few dams on the river built by the Mexicans to turn water into their irrigating ditches. Still, as they are usually washed out more or less with every flood, they would make little difference, or at the most a thousand or two dollars annually would cover all damages.

"Santa Fe at present has considerable business, arising almost wholly from the fact of its being the governmental and wholesale mercantile headquarters of New Mexico. By the Glorieta line this business would be controlled, as it would pass within 15 miles of the city. Via the Glorieta line is a strip of arable land 80 miles by two, through which the road will pass longitudinally, and in which are the main settlements of the district and where they will continue, road or no road. As shown in former letters, the principal export will be fruit, wine and vegetables, and the imports general merchandise and some grain and flour. The arable land of the valley from Santa Domingo to La Joya, given as 80 miles by two, is the area as already susceptible of cultivation by the present crude and unintelligent system of irrigation. With energy, sense and determination, it could be doubled, if not indeed more. From La Joya to this place (Palomas) is 121 miles, the grade averaging 25 feet to the mile. In adopting the Glorieta line the road passes down the valley of the Rio Grande from Santa Domingo to Palomas 200 miles through the portion of New Mexico which always has and always will support the largest population in the territory.

"Ultimately, the Indian Territory will be thrown open to settlers and to railroads, and sooner or later a road will be built westward via the Canadian Valley or 35th parallel route as far as business will justify. The Santa Fe's occupation of the valley of the Rio Grande will render inducements less for the extension of a rival road across the plains between the Canadian and this valley. In other words, it will occupy the settled portion of the country against all rivals. This, in and of itself, substantiates the belief in the final location of the line upon the Glorieta survey, but no mention has yet been made of possibly the greatest of all the advantages of the line in question—the Galisteo coal field within reach only of the Glorieta line. I have purposely refrained from detail as to them, owing to its great importance and the fact that to do the coal-fields justice will require much more space than I can give in this letter. The traffic arising from them in both directions—east and west—will constitute a large proportion of the carrying trade of the road. Great as is the importance of the coal region in and about the Raton mountains, it will prove comparatively insignificant when the development of the Galisteo coal fields is fairly inaugurated. The coal is anthracite, of quality pronounced the equal of Pennsylvania, and the supply is simply beyond computation.

"The road turning westward from this point leaves something over 100 miles of the Rio Grande valley to the south, but, outside of that portion known as the Mesilla valley, the section is not of particular moment. The Mesilla valley is, however, exceedingly rich in possibilities, its fruit interests promising to rival those of California. Little attention is given other industries, and it is only of late years that the vineyards have received anything approaching the attention their richness justifies. The wines known as the El Paso, and which to-day command a higher price in the earlier markets than any brands of similar character, all come from this valley, which is known locally as the Mesilla to the Texas line. With the Santa Fe even where it practically is, at Las Vegas, the trade of the Mesilla district is nearer a railroad by fully 500 miles than to the Texas Pacific at Fort Worth. The Texas Pacific at El Paso and the Santa Fe at the point where it will leave the river and Mesilla would be nearer the Santa Fe by forty miles than the Texas Pacific. Thus, while not extending into the Mesilla valley, the Santa Fe will control the great bulk of its business against a line that a way off in the future may possibly get near enough to compete."

Baltimore & Ohio.—This company offers, through Drexel, Morgan & Co., of New York, an issue of \$3,000,000 new 6 per cent. bonds having 40 years to run, and secured by a special mortgage on the 105 miles of the Parkersburg Branch. The bonds are direct obligations of the company and the security is given by the pledge with the trustees of an equal amount of Parkersburg Branch first-mortgage bonds. They are offered at 105 and accrued interest, and it is stated that a large amount has already been subscribed for. This is the first loan the company has offered in this country for some time. Aug. 7 the price was raised to 106½.

The *Baltimore Gazette* of Aug. 4 says: "Saturday morning the construction of four new telegraph wires from Baltimore to Washington, D. C., was commenced by the Baltimore & Ohio Railroad Company under the supervision of Mr. Charles A. Tinker, Superintendent of Telegraph of that company. These additional facilities were found to be necessary in consequence of the recently increased general telegraphic business of the Baltimore & Ohio Company, and in view of the increased equipment contemplated between this city, Washington and Chicago. The independent lines of the Baltimore & Ohio Company to Cincinnati, St. Louis, Louisville, Columbus and other points in the West will be pushed through at once. The petition for a preliminary injunction by the Western Union Telegraph Company to restrain the American Union Telegraph Company (the coadjutor of the Baltimore & Ohio Company in the National Railway Telegraph Scheme) from using the telegraph equipment of the St. Louis, Kansas City & Northern Railway Company was denied by the courts at Richmond, Mo., Friday, and the defendants will proceed at once to build along the line of that road. Another injunction by the same to restrain the American Union Telegraph Company from similar franchises of the Toledo, Wabash & Western Railroad was allowed in Chicago Friday, and it is probable that the defendant will now take advantage of a parallel right of way previously obtained. The Eastern telegraph connections of the Baltimore & Ohio Company are also progressing rapidly. The line between this city and Philadelphia is completed, with the exception of a few miles between Wilmington, Del., and Chester, Pa., which are now being built."

Bay View, Little Traverse & Mackinaw.—This projected branch or extension of the Grand Rapids & Indiana has been located from Bay View, Mich., to Little Traverse, and surveys are being made northward to Mackinaw.

Burlington, Monmouth & Illinois River.—Subscriptions for this road are solicited by a committee in Peoria, Ill., but the interest in it has not been very great. It is desired to raise about \$63,000 in Peoria.

Cairo & St. Louis.—The Receiver has bought a tract of land in East St. Louis, on which a new depot and engine-house are to be built, giving the road proper terminal facilities for the first time. The coal dump at East Carondelet is being extended out into the river, so that boats can be loaded at any stage of water. The depot property at Cairo is also to be improved. During the first half of this year nearly 1,800 feet of trestle have been filled in, a large number of bridges rebuilt and much work done on the road-bed.

Camden & Atlantic.—The travel over this road to At-

lantic City is heavier than ever before, and in one day last week 96 car-loads of excursionists were taken down. The net earnings of the road for the six months ending July 1 were over \$40,000 ahead of last year.

The company has just bought a new ferry-boat, which cost \$54,000, and is now in use on the ferry between Camden and Philadelphia.

Central Pacific.—Preparations are being hurried forward for the opening up of the new route between San Francisco and Sacramento by the Northern Branch to Martinez, then by ferry to Benicia, and thence by the California Pacific to Sacramento. The branch of the California Pacific from Suisun to Benicia is being ballasted and put in readiness. The ferry slips at Benicia and Martinez are being built. The ferry-boat is well advanced; it is of enormous size, and will be able to carry at one trip 24 passenger or 45 freight cars. The ferry is only about a mile long, and it is said that the distance to be crossed is only a little over six times the length of the boat. The new route will be much the shortest between San Francisco and Sacramento, and will be used for through trains.

The company is building several new tracks in Oakland, and a large amount of filling out into the bay has already been done there.

Chicago & Lake Huron.—A dispatch from Port Huron, Mich., July 29, says: "Mr. Charles B. Peck, General Manager of the Chicago & Lake Huron Railroad, advertises for tenders for the immediate construction of a new railroad between Flint and Lansing, connecting the Eastern and Western divisions of the Chicago & Lake Huron road, to be full tied, stone culverts, stone and iron bridges and steel rails. It is the intention of the Grand Trunk managers to push the road to completion at the earliest possible day, and it will probably be in running order before the end of this year. The date named for opening bids is Aug. 15."

Chicago, Milwaukee & St. Paul.—Many reports are current as to the extension of the Iowa & Dakota Division westward. The grading was finished to Firesteel, Dak., on the James River, but work on this branch was stopped and the contractors put on the branch from Finleyville to Yankton. It is now said that the Firesteel line is given up, at least for the present, and that the extension will be pushed to Yankton and beyond into the Niobrara Valley.

Chicago & Northwestern.—This company has added to its leased lines the 58 miles of the Des Moines & Minneapolis road, 3-ft. gauge, as noted elsewhere.

A branch track is to be built in Dixon, Ill., to connect the principal factories and warehouses of the town directly with this road and the Illinois Central, and enable freight to be loaded and unloaded where needed, without the expense of teaming.

Cincinnati & Terre Haute.—The purchasers at the recent foreclosure sale have organized the Terre Haute & Southeastern Company. They are now in possession of the road, which is in operation from Terre Haute, Ind., to Markland, 26 miles.

Clarksburg, Weston & Glenville.—Track on this road is now laid to a point 14 miles east of Clarksburg, W. Va., leaving 12 miles to complete it to Weston. It has one engine, one passenger car, one box and two gondola cars, and it is claimed that it can be completed for \$3,000 per mile.

Cleveland, Painesville & Ashtabula.—This company intends to begin work on its road this fall and hopes to have it finished in three years to the Pennsylvania line. No arrangements have yet been made for extension beyond that point. The 10 miles already owned (the old Lake View & Collamer road) is to be re-laid with heavier iron and otherwise improved. The new road will run further back from the lake than the Lake Shore road, and the company expects to build it at moderate cost, and to secure a large local business, including a suburban business from Cleveland.

Columbus, Chicago & Indiana Central.—The decision of the United States Circuit Court in the suits affecting the lease of this road was announced in New York, Aug. 6. The points of the decision are as follows:

First—That the lessors are not obligated to classify and adjust their indebtedness in the manner insisted upon by the lessees in the recent argument at Chicago; that is to say, by reducing the aggregate indebtedness to \$15,821,000 and funding into bonds secured under the consolidated mortgages to Roosevelt and Fodick such of the \$15,821,000 other than the \$921,000 Columbus & Indianapolis second-mortgage bonds as now consists of sectional bonds, but that it is sufficient for the lessors to reduce the aggregate indebtedness to \$15,821,000 which may consist of either consolidated or sectional bonds.

Second—That the Columbus, Chicago & Indiana Central Railway Company must actually accomplish the reduction of the indebtedness to \$15,821,000 before it will be entitled to a decree against the Pittsburgh, Cincinnati & St. Louis Railway Company and the Pennsylvania Railroad Company for payment of the back rental due under the lease; that upon completing such reduction of the indebtedness it may apply to the court for such a decree, but will not be entitled to interest upon the arrears of rent.

Columbus, Washington & Cincinnati.—The recent sale of this road has been set aside by the Court, on the grounds that there was no appraisal of property as required by law, and also that an agreement had been made which prevented competition at the sale. The Court further held that a clause in the trust deed, authorizing sale without appraisal, was null and void.

Dakota Southern.—It is reported that Mr. John I. Blair has lately bought a controlling interest in this road, and that he intends to build it from Yankton westward into the Niobrara Valley, where a rich country is being settled very fast. It is said that he will also extend the leased Sioux City & Pembina road from Beloit north to Sioux Falls, and the company has already offered to do this if the right of way is given.

Davenport & Northwestern.—The reported sale of a controlling interest to the Chicago, Milwaukee & St. Paul Company is confirmed, and the new owner is expected to take possession very soon.

Denver & Boulder Valley.—A movement is said to be on foot to foreclose the mortgage on this road, the interest being in default. The report is that the plan is to secure control in the interest of the Central Branch, Union Pacific, which hopes to reach Denver in a year or two, and wants the road as a feeder and to supply coal. The road is 37 miles long, from Hughes, Cal., to Boulder, reaching an important coal district, and is controlled by the Kansas Pacific.

Denver, South Park & Pacific.—The grading of this road is now completed down Trout Creek to the Arkansas, and tracklaying is in progress beyond the present terminus, 90 miles from Denver.

Des Moines, Adel & Western.—This road is now

graded from the terminus at Adel, Ia., westward to Panora, in Guthrie County, 21½ miles. It is in operation from Waukegan, Ia., to Adel, about 7 miles. Rails for the extension have been contracted for and a few delivered.

Des Moines & Marshalltown.—This company has been organized to build a railroad from Des Moines, Ia., northeast to Marshalltown and thence east to Marion, on the Chicago, Milwaukee & St. Paul's Western Union Division. The distance is about 120 miles, and 70 miles of the line are parallel and close to the Chicago & Northwestern. The company is organized in the Milwaukee & St. Paul interest.

Des Moines & Minneapolis.—It is announced that from Aug. 1 this road will be operated by the Chicago & Northwestern Company under perpetual lease. It will be known as the Des Moines Division of the Northwestern. The road is of 3-ft. gauge and is now in operation from Des Moines, Ia., northward to Callahan, 58 miles, crossing the Northwestern at Ames, 37 miles from Des Moines. A controlling interest in the road was lately sold to Mr. John B. Alley, of Boston, part of which has since been transferred to Mr. John I. Blair. The road is said to be doing a good business.

The official order in the case, dated July 30, is as follows: "This company has leased its entire railroad and property to the Chicago & Northwestern Railway Company, to take effect Aug. 1, 1879. All earnings derived from the operation of the road prior to Aug. 1, 1879, will be reported to the Des Moines & Minneapolis Company, at Des Moines; and all indebtedness incurred by the said company prior thereto will be settled by it."

Duncannon & Bloomfield.—This company has concluded an agreement by which it is to grade the road and furnish ties, when the Pennsylvania Railroad Company will lay the track and lease the road, taking pay for the iron in first-mortgage bonds. The road will be 10 miles long, from the Pennsylvania near Duncannon, Pa., to New Bloomfield in Perry County.

Evansville Local Trade.—Evansville, Ind., has voted \$65,000 in aid of this company, to complete the Cincinnati, Rockport & Southwestern road to Evansville.

Ft. Wayne, Jackson & Saginaw.—In the United States Circuit Court in Indianapolis, last week, a decree of foreclosure and sale was entered against this road, at the suit of the trustees under the first mortgage. The road is 100 miles long, from Ft. Wayne, Ind., to Jackson, Mich. Its bonded debt consists of \$1,500,000 first and \$500,000 second-mortgage bonds.

Grand Trunk and the Great Western.—A dispatch from London, England, Aug. 6, says: "The boards of directors of the Grand Trunk and the Great Western railways, of Canada, have agreed upon the basis of a joint-purse arrangement. The details are to be settled by arbitration."

Helena & Iron Mountain.—Work is reported resumed on this road and tracklaying will soon be begun. The line is from Helena, Ark., northwest to the St. Louis, Iron Mountain & Southern, near Moark, about 140 miles. Some 40 miles from Helena out were graded several years ago.

Kansas & Southwestern.—This company has been organized to build a railroad from Lindsburg, Kan., the terminus of a branch of the Kansas Pacific, southwest to the southern line of Kansas, about 125 miles.

Lake Erie & Louisville, of Indiana.—This company has filed articles of incorporation in Indiana, the proposed line being from the Ohio line in Jay County south by west to North Vernon, about 110 miles. The incorporators are all connected with the Lake Erie & Louisville, of Ohio, and the La Fayette, Bloomington & Muncie Companies.

Leavenworth & Southwestern.—This company has filed articles of incorporation for a narrow-gauge road from Onaga, Kan., the terminus of the Kansas Central road, southward into the Vermillion Valley, across the Kansas Pacific, and then westward on a line about half-way between the Kansas Pacific and the Atchison, Topeka & Santa Fe, to the Colorado line. Several branches are also projected.

Louisville, Cincinnati & Lexington.—At a recent meeting the stockholders ratified a contract for a lease of the Shelby Railroad for thirty years at a rental of \$15,000 a year, the lessor to pay all taxes. The lessee buys the equipment now on the leased road. This ends a sharp controversy between the companies. The Shelby road extends from Shelby Junction, Ky., to Shelbyville, 18½ miles, and was formerly worked by this company.

The stockholders also ratified the contract with the Cumberland & Ohio, Northern Division. Under this agreement the Louisville, Cincinnati & Lexington is to build the road from Bloomfield, Ky., to Eminence, and to lease it when finished, the Cumberland & Ohio agreeing to issue \$350,000 first-mortgage bonds, of which \$250,000 must be sold before the lessee is required to begin work on the road, and before Sept. 1, 1880.

Louisville & Nashville.—A circular issued by this company July 29 says:

"The Louisville & Nashville Railroad Company will assume the control and management of the St. Louis & Southeastern Railroad, from Henderson to Nashville, on Aug. 1, 1879."

The newly-acquired line will be known as the Evansville, Henderson & Nashville Division. It adds 145 miles to this company's lines, and makes its total mileage 1,118 miles.

Louisiana Western.—Work on this road is reported as advancing well. Grading parties are working from Vermillionville, La., westward and from Lake Charles eastward, and track-laying has been begun at Lake Charles, where the rails are delivered by boat. The piers for the Sabine and Calcasieu River bridges are done, and the heavy piling in the Sabine bottom is being put down as fast as the nature of the work will permit.

The road starts from the terminus of the Texas & New Orleans road at Orange, Tex., 108 miles from Houston, and runs to Vermillionville, La., 110 miles, meeting there the extension of Morgan's Louisiana & Texas road, 143 miles from New Orleans; it will complete a line from New Orleans to Houston 361 miles long. About one-third of this Louisiana Western section of the line lies in the stock ranges of Western Louisiana; about one-third in the pine forests of the Calcasieu region, and the eastern third in the level and rich prairie farming country of Vermillion Parish. The country is mainly level and open, and the road will be an easy one to work. No less than 98½ per cent. of the line is straight line, one tangent being 80 miles long; 92 per cent. is level and the highest grade is only 20 feet to the mile. The most expensive work is the bridging, the country being full of streams and bayous, many of them difficult to cross, having deep and treacherous beds. The chief bridges and trestles are at the Sabine River, seven miles from Orange, and over the wide bottoms adjoining the river; Sulphur Mine Marsh, 24½ miles from Orange; Calcasieu River, 36 miles from Orange, and near that point the Lake Charles trestle; English Bayou, 54 miles from Orange; Lacassine Bayou, 56 miles; Bayou Nezpique, 73 miles; Bayou des Canes, 77

miles, and Bayou Plaquemines, 87 miles from Orange. Draw-bridges are necessary at several points.

Mail Transportation.—The Second Assistant Postmaster General, in accordance with an act of Congress passed March 3, 1879, has just issued an important circular letter to all the railroads of the country carrying government mails. The act reads:

"That the Postmaster-General shall request all railroad companies transporting the mails to furnish, under seal, such data relating to the operating receipts and expenditures of such roads as may in his judgment be deemed necessary to enable him to ascertain the cost of mail transportation and the proper compensation to be paid for the same; and he shall in his annual report to Congress make such recommendations, founded on the information obtained under this section, as shall, in his opinion, be just and equitable."

In compliance with this requirement of law, he requests the following information: First, the average number and length in feet and inches of the passenger coaches, including sleeping cars, run daily; second, the (average) number and length in feet and inches of the cars or apartments used for baggage run over the road in each direction daily; third, the number and length in feet and inches of the cars or apartments used for express matter run over the road in each direction daily; fourth, the amount received for the transportation of passengers and the cost of running passenger coaches; fifth, the cost of running cars or apartments for baggage; sixth, the amount received for the conveyance of express matter and the cost of running the cars or apartments devoted to the use of the same; seventh, the actual expenditure for the conveyance of mails between stations and post-offices where the latter are not over eighty rods distant from the former; eighth, separate statement of Sunday trains.

Manhattan & Big Blue Valley.—This company has been organized in Kansas to build a railroad from Manhattan northward up the Big Blue valley to the Nebraska line, about 65 miles. It is a reorganization of the Manhattan & Northwestern, whose property was lately sold under foreclosure.

Marietta & Cincinnati.—The Court has granted Receiver King leave to build tracks in the city of Cincinnati to connect the road with the Cincinnati Southern yards, with the necessary siding, etc., for transferring freight. The Court also authorizes the Receiver to abandon the use of the old road between Warren's and Marietta, as unsafe for travel. This part of the road has been little used since the opening of the Baltimore Short Line.

Massachusetts Central.—It is said that the parties now controlling this company have succeeded in getting possession of all the old bonds but a few thousand dollars. These, it is thought can be secured also, when the old mortgage will be at once canceled and a new one executed, under which bonds enough will be issued to provide for the speedy completion of the road.

Missouri Pacific.—This company is making arrangements to establish a hospital for its employees, somewhat on the plan long successfully in practice on the Central Pacific. A fund for its support will be provided by an assessment of 50 cents per month on the pay of every employee of the road, in return for which they will be entitled to free treatment in the hospital when sick or injured. On the Central Pacific this system has been of great benefit to the employees, and its hospital is a notable institution.

Morgan's Louisiana & Texas.—Work on this road is progressing steadily, and the track has now reached New Iberia, La., 11 miles beyond the late terminus at Jeanerette, 45 miles from Morgan City and 125 miles from New Orleans. This leaves only 18 miles of track to be laid to complete the road to Vermillionville, where it will connect with the Louisiana Western.

New Hampshire Railroad Regulation.—The Nashua (N. H.) Telegraph thus refers to the failure of the railroad law in the New Hampshire Legislature:

"The railroad bill fell between the two houses. The Senate was induced to support a measure that went just as far as the Massachusetts law goes, and which would unquestionably have wrought much good, and met every just complaint of the people, but the House insisted on giving the present railroad commissioners, a political tribunal elected for no such duties, absolute control of the fares and freights of all the railroads of the State, and rejected the right of appeal to the Attorney-General and the next Legislature, as provided in the Senate bill. The Senate never more signally showed its value as a check against an extreme and unreasoning demand in legislation than it showed in this case. When every contest involving the value of a hundred dollars or more has the right of appeal upon a new trial of the facts, the utter untenableness of the House bill, which put the control of thirty millions of property into the hands of a tribunal of inexperience and uncertainty, becomes strikingly manifest. In rejecting this unconstitutional and indefensible attack upon property, the Senate was true to itself and to its place in our system of government. The Senate bill was a just and prudent measure. It came from the people's side in this contest. Neither the railroads nor their attorneys had anything to do with proposing or drafting it, and they accepted it simply as less obnoxious to them than the House bill. The charge that it was in the interest of the railroads or was inspired by them was simply a malicious misrepresentation, come from whatever source it did. That a measure so comprehensive and beneficent should have been rejected by the House, simply because it did not go to the extreme of absolute confiscation of the control of railroad fares and freights by an inexperienced tribunal without any appeal upon the facts, is utterly inexplicable and indefensible."

New York Central & Hudson River.—This company has submitted to the City Council of Rochester, N. Y., a plan by which all the difficulties between the company and the city will be settled. The plan provides for the elevation of the tracks through the city so that there shall be no grade crossings, the company to build four tracks on the elevated grade, with the right to build two more if needed. The work is to be done within two years, and the company is to retain the right to cross at grade such streets as may be necessary in laying a track to connect the new tracks with the Niagara Falls and Charlotte branches. The city, on its part, is to make all the necessary street changes, closing two or three and changing the grades of some others. The plan as submitted has been carefully prepared by the company's engineers and provides very fully for all the details of the work. The City Council has referred the matter to a committee, which is to report next week.

At the suit of the Buffalo City (or Cross-town) Railroad Company, a temporary injunction has been granted against the building of this company's proposed track across the city of Buffalo. Argument on continuing or dissolving the injunction will be heard Aug. 11.

New York City & Northern.—Work on the completion of this road has been temporarily suspended, the contractor having given up his job. A new contract is to be made at once, and the company hopes to have the road in operation from High Bridge, in New York city to Brewster's before winter.

New York, Lake Erie & Western.—A large force is now at work on the new freight pier which is to occupy the site of the old ferry slips in New York. The pier will hardly be finished before the close of the year. It is to have a large warehouse upon it.

Extensive improvements are being made at the West End of the Bergen Tunnel. A round-house 320 feet in diameter has the brick walls more than half up, and is rapidly advancing. Grading is in progress for additional freight tracks, of which 18 are to be laid extending from the tunnel to the Penhorn Creek bridge, very nearly a mile. These tracks will not all be ready for use before next spring, when a large and convenient yard for sorting freight will be provided.

The company has appealed from the assessment on its Jersey City property made by the State Commissioner of Railroad Taxation, claiming that it is entirely too high, taking present values into consideration. The case was argued before the New Jersey Supreme Court at Trenton, Aug. 4, and decision reserved.

All arrangements had been made to abandon the Erie & Genesee Valley road, from Mt. Morris, N. Y., to Danville, on Aug. 1, but at the last moment an arrangement was made by which this company will continue to work the road, and a permanent adjustment of the difficulty will probably be made.

New York & New England.—It is said that the building of the extension from Waterbury, Conn., to Brewster, N. Y., will be postponed until next spring, chiefly on account of some trouble about getting the right of way into Danbury, Conn., and of delay in securing possession of the four miles of railroad from Danbury to Brookfield Junction. This is now worked by the Housatonic Company, and owned by the bondholders of the New York, Housatonic & Northern Company. It is desired to make it a part of the New York & New England line, if it can be bought at a reasonable price.

New York & Oswego Midland.—In the United States Circuit Court last week a motion to reduce the price fixed by the decree of sale, below which the road cannot be sold, was granted, and the court reduce the limit from \$2,500,000 to \$100,000.

The holders of Receivers' certificates are given until Sept. 15 to join in the agreement for the purchase of the road.

Norfolk County.—This old Massachusetts road was merged in the Boston, Hartford & Erie, now the New York & New England. For 25 years the suit of Robert G. Shaw and others against the company has been pending in the Massachusetts Supreme Court, and now James W. Converse, sole surviving trustee, makes application to the Court to file his final account and be discharged from the trust, thus closing up the suit. The Court set Sept. 15 for a final hearing and audit. The singular feature in the case is that Mr. Converse holds about \$3,600, for which he can find no owner, and no one has any claim for the same. This is in Massachusetts, where they are a little old-fashioned in such matters; in New York—and some other states—a trustee would have known better than that.

Painesville & Youngstown.—The purchasers of this road at foreclosure sale have filed articles of incorporation under the same name, the capital stock to be \$2,200,000. The road is of 3-ft. gauge, and extends from Youngstown, O., to Fairport, 33 miles.

Pennsylvania.—A survey was begun this week for the proposed branch from Germantown Junction through Germantown to Chestnut Hill. This branch has already been referred to, and is thought to be the beginning of a new line to the Lehigh Valley at Bethlehem.

At a meeting of the board held Aug. 6 plans were presented and approved for the proposed new line from the West Philadelphia depot to Fifteenth and Market streets in Philadelphia. The line is to be an elevated one through the city.

Pennsylvania Corporation Taxes.—The Pennsylvania Auditor-General has issued a circular in relation to the duties of incorporated companies, including railroads, under the new tax-law of the state. The law is very strict, and all companies must register in compliance with it, whether they can claim exemption from taxation or not. The exemption is to be established afterward, if they are entitled to it.

Philadelphia & Reading.—It was reported in Philadelphia last week that President Gowen had succeeded in placing a loan of \$5,000,000 in London. No particulars were given.

Another Philadelphia report is that the company is considering the policy of building a line from Harrisburg to Pittsburgh by way of the Cumberland Valley (where it has large iron interests), and thence by Bedford, Somerset and the Youghiogheny Valley, on the line surveyed many years ago for the Southern Pennsylvania.

Large car shops are to be built at Pottsville, Pa., chiefly for the repair of the coal equipment.

Pittston & Hawley.—Surveys are said to be actually in progress for the proposed new coal road from Pittston, Luzerne County, Pa., to Hawley, about 50 miles, where it will connect with a branch of the Erie. It has been talked about for some time and is, indeed, an old project of 25 years' standing or more. It is now reported that parties interested in the Erie road are prepared to build the line at once.

Portland & Ogdensburg, Vermont Division.—The Receivers have let to N. C. Munson, of Boston, the contract for filling certain trestles, building the necessary culverts and other masonry, and completing the ballasting of the road, and he has already begun work with a large force of men and several trains. The contract price is \$150,000. Work is in progress at the Clay Hill, Stocker and Paine trestles, and surveys are being made at Pumpkin Hill trestle preparatory to beginning work there.

Portsmouth & Dover.—At the annual meeting in Portsmouth, N. H., Aug. 4, the directors reported that they were unanimously of opinion that they had no power to grant any reduction in the rent of the road as asked by the Eastern Company, the lessee, and that they could see no valid reason for so doing. The objections of the Eastern Company came too late, after the lease had been duly ratified and eight payments of rental made without objection. Further, most of the stock was held by the cities of Dover and Portsmouth, and it was doubtful whether the authorities of those cities had the power to consent to any change in the contract. The Eastern Company had offered to pay the rent due July 1, if they would give a conditional receipt, reserving the rights of the Eastern in case the amount then paid should be determined hereafter not to be due.

The stockholders unanimously voted that no such conditional receipt should be given, and approved the course of the directors.

Quebec, Montreal, Ottawa & Occidental.—The contract for the extension from the present terminus at Hoche-

laga into the city of Montreal, has been awarded to J. D. McDonald, of Thorold, Ont., work to be begun at once.

St. Louis, Kansas City & Northern.—In consequence of its trouble with the Hannibal & St. Joseph, this company has begun to build an independent track from Harlem Junction, Mo., to the Kansas City Bridge, 8¼ miles. As to the bridge itself, it is claimed that under the charter it must be kept open to the trains of all roads on payment of reasonable tolls, and that the Hannibal & St. Joseph cannot refuse to allow this company's trains to cross it. It is also claimed that the tolls heretofore paid for the use of the bridge are exorbitant, and that the company could really save much money by building a new bridge.

St. Louis & San Francisco.—The following circular is dated Aug. 1:

"This company having purchased the Missouri & Western Railway (Peirce City, Mo., to Oswego, Kan., 74 miles, Oronogo, Mo., to Joplin, Mo., 10 miles); and the Joplin Railroad (Joplin, Mo., to Girard, Kan., 37 miles), these lines will be from this date known and operated as the Kansas Division of this railway."

St. Louis, Shelbyville & Eastern.—This company has filed articles of incorporation for a narrow-gauge railroad from East St. Louis east by north across Illinois to the Indiana line near Danville, a distance of about 180 miles. Capital stock is fixed at \$500,000. It is apparently intended as a branch or extension to St. Louis for the Toledo, Delphos & Burlington road now under construction in Indiana.

St. Paul and the Lake Outlet.—The favorite plan at St. Paul just now appears to be the building of a railroad from St. Paul to the Sault Ste. Marie, about 450 miles. At the Sault a lake connection is always ready, and other railroads may be reached by branches or extensions.

St. Paul & Duluth.—President Isley has made the following statements concerning the recent purchase of stock of this company by men interested in the Chicago, Milwaukee & St. Paul and the Chicago & Northwestern, and concerning the future policy of the company:

"The fact is, that the sale of a certain amount of the stock to new parties who represent other interests identical to this, and who do not wish to jeopardize an investment they are making in another road to the lake by having this fall into the hands of hostile parties, does not change the situation of this company or its policy in regard to business enterprise. It has not fallen into the hands of the Chicago & Northwestern, as was so freely telegraphed all over the country by one who should have been more careful than to circulate sensational rumors that he knew would excite the community; nor has it fallen into the hands of any corporation or company, but simply has been bought by a few gentlemen who wish to develop its business to the fullest extent, and that can only be done by seeking to encourage every interest in Minnesota that will give it business. To show that I am not making these statements unadvisedly, and not with the intention of upsetting any little scheme the above gentlemen have of foisting upon the public under the excitement of the many rumors afloat, but simply to show to the people of Minnesota that the St. Paul & Duluth railroad is not lost as you state in your article of July 15, I make the following offer to any railroad company in the state connecting with this company's road at St. Paul, Minneapolis, or White Bear: That this company will enter into a contract with any other railroad company wishing to send the products of its line to Duluth, to carry the same to Duluth at such rates of freight as they may make, only allowing this company the same rate per ton per mile that they receive for taking such freight from the point of reception to St. Paul, or to the point at which it reaches this road; this company to have the same right to send such articles of freight as it may receive at Duluth to points on said roads upon the same terms and conditions.

"If this does not cover the point of throwing this road into the whole system of Minnesota roads wishing to keep the Duluth route open, then I am willing to accept any modification which will accomplish the desired end."

St. Paul & Pacific.—The trustees announce that they have funds in hand to pay the following old coupons: On the \$6,000,000 mortgage of the First Division, coupon No. 11, due Nov. 1, 1873, and \$23 unpaid on each coupon No. 10, due May 1, 1873; on the \$1,200,000 mortgage, coupons Nos. 23, 24 and 25, due Dec. 1, 1873, June 1 and Dec. 1, 1874. Payment will be made on presentation of the coupons to J. S. Kennedy & Co., No. 63 William street, New York.

The Clerk of the Ramsey County District Court gives notice that he is prepared to pay, at his office in St. Paul, Minn., out of the proceeds of the foreclosure sales deposited with the Court, to all holders who have not received such dividend, the following dividends on bonds and overdue coupons issued under the foreclosed mortgage: On bonds of the \$1,200,000 mortgage of June 2, 1862, the sum of \$796.49 per \$1,000 bond, being 59.256 per cent.; on bonds of the \$2,800,000 First Division mortgage of Oct. 1, 1865, 10.7 per cent., being \$163.69 per \$1,000 bond; on bonds of the \$6,000,000 First Division mortgage of July 1, 1868, 19.774 per cent., being \$285.27 per \$1,000 bond.

St. Paul & Sioux City.—Tracklaying was begun some time ago on the Fort Dodge Branch, leaving this road at Crystal Lake, Minn., but was delayed by the building of a Howe truss bridge 1,500 feet long, over the Watwan River. It is now completed to Garden City, eight miles from Crystal Lake. At Vernon, a short distance beyond, a bridge 2,000 feet long, is to be built; but when that is finished track can be laid rapidly to Blue Earth City, 26 miles from Garden City, which will be the terminus of the branch for the winter.

Tracklaying has been begun on the Rock Rapids Branch, which is now graded from the Worthington & Sioux Falls Branch at Laverne, Minn., south 28 miles to Rock Rapids in Lyon County, Ia. It will probably be finished next month.

The Minnesota & Black Hills Branch is now graded from Heron Lake, Minn., westward 30 miles and 10 miles of track have been laid. Another section of 15 miles is being graded, and the line is located to Flandrau on the Big Sioux River in Dakota, nearly 60 miles from Heron Lake. This branch is parallel to and north of the Worthington & Sioux Falls Branch. Work is being pushed forward to reach the Big Sioux River in advance of the other lines which are building into Southern Dakota.

South Pacific Coast.—Work on the tunnels and other heavy grading south of Los Gatos, Cal., is now in good shape, and the company expects to have cars running to Santa Cruz not later than Oct. 1.

Taylor's Falls & Lake Superior.—This company has lately been reorganized, the new managers being all connected with the Minneapolis & St. Louis Company. Arrangements are being made for the immediate construction of the road from White Bear Lake, Minn., north by east to Taylor's Falls, on the St. Croix, about 30 miles.

Valley of Ohio.—Work has lately been pushed on this road and the track is reported laid from Akron, O., south-

ward toward Canton 10 miles. From Akron northward the rails are laid to Peninsula, 16 miles, and the work of ballasting has been begun.

Villisca & Northern.—This company has been organized to build a railroad from Villisca, Ia., on the Chicago, Burlington & Quincy, northward up the Nodaway Valley to a point near Atlantic, on the Chicago, Rock Island & Pacific road. The distance is about 83 miles.

Warwick Valley.—Messrs. Arnold & Stevens, to whom the contract for the extension of 11 miles from Warwick, N. Y., to McAfee Valley, N. J., was let, did not furnish the required security, and the contract has now been let to Richard Smith, of Morristown, N. J. The contract price is \$85,000, which includes grading, masonry, ties and track-laying, the company furnishing the rails and putting up the bridges. Five miles are to be finished this year, and the whole road by May 1, 1880.

Watchung.—It is said that this road will soon be put in repair and trains put upon it by the New York & Greenwood Lake Company. The road, which is four miles long, from Woodside Park, N. J., to West Orange, has not been worked for several years, and never has been worked more than a few months.

Wisconsin Central.—A plan for the adjustment of this company's trouble, proposed by President Colby, has been approved by the trustees and will be submitted to the Court for approval. It provides that all holders of bonds shall be placed upon an equal footing, whether they joined in the funding agreement of July 1, 1875, or not; that the security of the present mortgages shall be retained, but that the bonds shall be surrendered and new bonds to an equal amount be issued, 40 per cent. of them to be absolute interest-bearing 6 per cent. bonds, the remaining 60 per cent. to be income bonds, with interest dependent upon the earnings of the road; that the land income notes be funded in bonds and the income from the land grant be applied to a sinking fund for the redemption of those bonds; and finally that the bondholders shall have absolute control of the property until the income bonds are in the regular receipt of at least 6 per cent. yearly interest. This plan will avoid a foreclosure.

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Missouri, Kansas & Texas.

This road includes the following lines:

Miles.
Main line, Hannibal, Mo., to Denison, Tex..... 575.5
Neosho Division, Parsons, Kan., to Junction City..... 156.5
Osage Division, Holden, Mo., to Paola, Kan..... 54.0
Total..... 786.0

The Denison & Southeastern road, from Denison, Tex., to Whitewright, 20 miles, is controlled and worked under special agreement, but its operations are not included in the general statement. The property is worked by the Union Trust Company, of New York, as trustee under an agreement with the bondholders, and its report is for the year ending Dec. 31, 1878.

The equipment consists of 88 locomotives; 34 passenger, 20 baggage and express and 5 postal cars; 757 box, 312 stock, 200 coal, 148 flat and 45 caboose cars; 1 pay-car, 1 business car, 1 magazine, 1 derrick, 4 boarding and 20 dump cars. During part of the year 100 additional box cars were leased.

The Trustee reports that \$14,695,000 consolidated bonds and \$2,313,000 Union Pacific, Southern Branch bonds have been assigned to the agreement. Of \$1,210,124.75 preferred stock and scrip issued, \$1,128,047.16 have been exchanged for income bonds and \$21,807.80 canceled in exchange for Tebo & Neosho coupons returned, leaving \$82,077.59 outstanding. Of income bonds issued under the agreement, \$3,007,626.32 were for coupons funded in whole or in part; \$1,128,047.16 for preferred stock and scrip surrendered, and

\$2,009,049.90 for floating debt settled. The total bonded debt is as follows:

Union Pacific Southern Branch bonds.....	\$2,321,000.00
Tebo & Neosho bonds.....	349,000.00
Hannibal & Central Mo. first-mortgage bonds.....	708,000.00
Hannibal & Central Mo. second-mortgage bonds.....	32,000.00
M., K. & T. consolidated bonds.....	14,732.00
M., K. & T. second-mortgage income bonds and scrip.....	8,804,820.00
Boonville Bridge bonds.....	968,000.00

Total..... \$25,904,020.99

There were \$32,000 Boonville Bridge bonds redeemed during the year, and \$134,771.56 bonds and coupons were received in payment for lands.

The traffic of the road for the year was as follows:

	1877.	Inc. or Dec.	P. c.
Train mileage.....	930,358	845,891	12.6
Passenger.....	1,610,651	1,587,092	1.5
Freight.....	2,561,009	2,430,983	5.3

	1877.	Inc. or Dec.	P. c.
Locomotive mileage.....	2,950,176	2,554,729	15.5
Cost of loco. service per mile.....	16.86 cts.	18.08 cts. D.	1.22 cts. 6.7

	1877.	Inc. or Dec.	P. c.
Passengers carried.....	265,473	225,722	17.6
Passenger mileage.....	22,581,541	24,520,090	7.9
Tons freight carried.....	490,000	500,792	2.1
Tonnage mileage.....	118,190,343	110,895,714	6.6

	1877.	Inc. or Dec.	P. c.
Av. train load: number.....	23.76	29.00	18.3
Freight, tons.....	73.38	60.87	5.0
Av. cars per train: Passenger.....	4.90	5.00	2.0
Freight.....	15.70	14.90	5.4

The average cost per car per mile was, for passenger cars, 3.98 cents; freight, 1.63 cents. Leading items of freight were 12,889 car-loads coal; 5,517 car-loads coal; 4,722 car-loads lumber; 3,724 car-loads wheat and 2,385 car-loads cotton. There was a very great decrease in corn shipments and a large gain in cotton. The gross and net earnings per train mile and per unit of traffic were, in cents:

	Earnings.	Expenses.	Net earn.
Per passenger train mile.....	80.700	62.400	18.300
Per freight train mile.....	128.700	97.300	29.400
Per passenger per mile.....	3.395	2.628	0.767
Per ton per mile.....	1.726	1.326	0.400

The average receipt per ton per mile in 1877 was 1.692 cents, showing a decrease of 13.6 per cent. last year.

The earnings for the year were as follows:

	1877.	Inc. or Dec.	P. c.
Passengers.....	\$706,601.02	\$832,675.71	17.6
Freight.....	2,030,927.72	2,176,275.36	7.9
Mail and exp'ns.....	164,737.88	149,700.34	10.0
Miscellaneous.....	10,414.49	38,670.29	73.0
Total.....	\$2,981,681.71	\$3,197,321.07	6.7

	1877.	Inc. or Dec.	P. c.
Expenses and renewals.....	2,392,739.21	2,034,932.80	13.2
Net earnings.....	\$678,942.50	\$1,162,388.27	41.6

	1877.	Inc. or Dec.	P. c.
Gross earn. per mile.....	3,793.40	4,067.84	6.7
Net earn. per mile.....	603.80	1,478.87	11.6
P. cent. of exp'ns.....	77.23	63.04	18.5

Renewals amounted to \$460,219.80 in 1878 against \$416,197.71 in 1877. The loss in earnings was due to decrease in some classes of traffic and to lower rates. The increase in expenses was chiefly due to the pressing need of extensive renewals of road. Other charges upon income were as follows:

Net earnings, as above.....	\$678,942.50
Improvements to property.....	\$206,984.42
Rental of leased equipment, etc.....	43,124.86
Taxes, etc.....	80,350.11
Total.....	\$30,459.39

Net income..... \$348,483.11
The decrease in rates was partly due to competition and partly to the enforcement of the Missouri law regulating rates on local business.

Renewals included 6,771 tons of steel rails and 445,211 new ties. There are now 136 miles of steel track in the main line. A very large amount of work was done on the bridges and trestles of the road. This work was made necessary by the rapid failure of the rails and other material used in the first building of the road, and additional expense was caused by the damage resulting from heavy rains and freshets.

From the net earnings above \$33,083.41 was paid on purchase of leased equipment, leaving a balance of \$315,399.70. The Trustee's account may be summed up as follows:

Balance, cash and assets, Dec. 31, 1877.....	\$289,480.10
Net proceeds of road as above.....	315,399.70
Interest, insurance, etc.....	8,705.94
Total.....	\$613,585.74
Gold bought to pay coupons.....	\$100,572.85
Equalization of 1874 dividend.....	244.61
On account of new cotton press at Denison.....	10,000.00
Liquidation of old accounts.....	15,328.44
Land Department.....	18,171.84
Mo. Kan. & Tex. Co. under agreement.....	12,000.00
Advisory board, expenses.....	5,000.00
General expenses of trust.....	34,113.26
Total.....	\$285,431.00

Balance, Dec. 31, 1878..... \$328,223.80

Of this balance \$50,624.33 was in General Manager's assets; \$188,601.49 in Houston & Texas Central notes; \$2,160 in gold for Coupons, and \$86,837.98 cash balance. The Trustee was unable to make full payments on coupons under the agreement, on account of the small net income.

The income of the Boonville Bridge was \$85,658.33; payments for interest, \$68,959.53; bonds drawn for sinking fund, \$22,165; miscellaneous, \$1,666.75, the whole reducing the balance on hand from \$34,468.34 to \$27,385.30.

The Land Department sold 97,122 acres for \$214,944.28, of which \$44,813.36 was received in cash, \$44,808.65 in land contracts and the balance in bonds. Total receipts on land contracts were \$202,593.10, of which \$67,821.54 was paid in cash, the balance in bonds. The expenses of the Land Department were \$25,704.38; legal expenses and taxes, \$38,280.48, making payments of \$58,984.86 in all, on this account.

Pennsylvania Company.

This company, as is well known, is the organization through which the Pennsylvania Railroad Company operates its lines west of Pittsburgh. Statements of the operations of the lines leased directly or controlled by it have been heretofore published from time to time under the names of the different roads. The following statements give the condition of the company itself and the result to it of the working of the various lines under its direct management or control—3,595 miles in all—for the year ending Dec. 31, 1878.

The general account at the close of the year was as follows:

Common stock.....	\$3,000,000
Preferred stock.....	8,000,000

Total capital stock.....	\$11,000,000
Judgment 6 per cent. bonds.....	7,000,000
Registered 6 per cent. bonds, secured by guaranteed special stock of P., Ft. W. & C. Ry. Co.....	3,200,000
Due lessor companies for supplies, etc.....	803,411
Due to other companies.....	978,193
Due for current expenses, operating leased roads.....	1,336,607
Miscellaneous liabilities.....	219,657
Reserve fund—leased roads.....	1,379,198
Balance to credit of profit and loss.....	77,521
Total.....	\$25,894,557

Securities.....	\$15,357,389
Bills receivable.....	267,448
Equipment.....	808,546
Real estate.....	921,506
Union Line property.....	2,773,025
Due for betterments to leased roads.....	170,900
Due by Pa. R. R. Co., not including current balances.....	989
Due by other companies.....	1,643,812
Due by station agents.....	997,051
Stock of supplies.....	513,102
Miscellaneous assets.....	271,117
Cash.....	508,823
Advanced Union Bridge Co., Toledo.....	21,647
Advanced to pay first mortgage coupons, G. R. & I. R. R. Co.....	137,502
Purchase of liens on real estate bought by C., C. & I. C. R. R. Co.....	48,486
Sinking fund for registered 6 per cent. bonds.....	113,000
Phila. Trust, Safe Dep. & Ins. Co., Trustee.....	346
Sinking funds for leased roads.....	1,270,168
Total.....	\$25,894,557

The company actually owns no railroad property except some equipment and real estate. Its ownership is confined to railroad securities and leasehold interests.

The following statements show the net results to the company of its operations for the year:

Profit from operating Pitts., Ft. Wayne & Chicago road.....	\$728,594
Profit from operating New Castle & Beaver Valley road.....	19,532
Profit from operating Lawrence road.....	22,824
Total.....	\$770,950

Less loss on Erie & Pittsburgh.....	\$217,437
" " Cleveland & Pittsburgh.....	80,013
" " Jeff., Mad. & Ind.....	51,937
" " Toledo & Woodville.....	7,129
Total.....	\$356,516

Balance of profit from leased roads.....	\$414,434
Net earnings Union Line property.....	581,748
Rent of Monongahela Extension.....	37,500
" " real estate.....	47,328
" " equipment.....	45,210
" " Toledo & State Line road, four months.....	2,946
Dividends collected on stocks.....	324,480
Interest collected on bonds.....	70,900
Total.....	\$1,504,610

Against these gross receipts charges are to be offset as follows:

Gross receipts as above.....	\$1,504,610
Advances to Pitts., Cin. & St. Louis Co.....	\$180,410
Ind. & Vincennes Co.....	218,002
Ind. & St. Louis Co.....	47,654
Cin., Richmond & Ft. Wayne Co.....	26,980
General expenses.....	68,296
Interest on floating debt.....	30,872
Interest on 6 per cent. registered bonds.....	155,925
Total.....	\$726,139

Net profit for 1878..... \$778,471

No charge is made for interest on the \$7,000,000 judgment 6 per cent. bonds, which are held by the Pennsylvania Railroad Company. The profit and loss account is summed up for the year as follows:

Net profit for 1878, as above.....	\$778,471
Profit on sale of securities applicable to previous year.....	10,011
Total.....	\$794,482

Sinking funds of leased roads.....	\$187,200
Reduction in value of securities and bills receivable received in previous years.....	455,714
Debit balance of profit and loss, Dec. 31, 1877.....	74,047
Total.....	\$716,961